

Connection Community Content

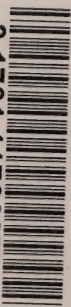
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The Challenge of the Information Highway



**Final Report
of the Information
Highway Advisory Council**

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The Challenge of the Information Highway

Final Report
of the Information
Highway Advisory Council

September 1995



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September 1995

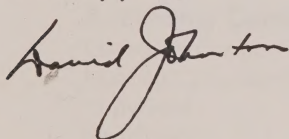
The Honourable John Manley, P.C., M.P.
Minister of Industry
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Minister:

I am pleased to present the final report of the Information Highway Advisory Council. *Connection Community Content: The Challenge of the Information Highway* reflects the work and views of Canadians engaged in building and using the Information Highway. After 15 months of careful deliberation and spirited debate, we offer it as our response to the challenge of creating a Canadian Information Highway that acts to both serve and renew this country.

We appreciate the opportunity to serve on this Council. We are grateful to you for your leadership and for the interest shown by your colleagues, the Honourable Jon Gerrard, Secretary of State (Science, Research and Development) and the Honourable Michel Dupuy, Minister of Canadian Heritage.

Sincerely yours,



David Johnston
Chair

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EXECUTIVE SUMMARY

The Challenge of the Information Highway

Information technology is changing our world. It is reshaping our economy and affecting the life and work of almost every Canadian. As converging communications technologies bring digital content into the nation's businesses and homes in new ways, Canadians are beginning to sense what it means to travel the Information Highway.

In the 1994 Speech from the Throne, the Government of Canada made a commitment to develop a Canadian strategy for the Information Highway. To this end, the Minister of Industry, the Honourable John Manley, announced the creation of a 29-member Information Highway Advisory Council, chaired by David Johnston, former Principal and Vice Chancellor of McGill University, and now Professor of Law at McGill's Centre for Medicine, Ethics and Law.

the Advisory
Council

The government set out 15 issues – ranging from competition to culture, from access to learning and research and development – on which it sought the Council's advice. The Council's deliberations were guided by three objectives:

15 issues

- creating jobs through innovation and investment in Canada
- reinforcing Canadian sovereignty and cultural identity
- ensuring universal access at reasonable cost

and five principles:

- an interconnected and interoperable network of networks
- collaborative public and private sector development
- competition in facilities, products and services
- privacy protection and network security
- lifelong learning as a key design element of Canada's Information Highway.

15 PUBLIC POLICY ISSUES

- 1 How fast should the advanced network infrastructure be built?
How will network improvements be financed?
- 2 What is the proper balance between competition and regulation?
- 3 Should requirements for Canadian ownership and control of communications networks be reviewed?
- 4 How quickly can Canadian industries move toward universal standards, and how should these standards be determined?
- 5 How can the federal government coordinate its activities with other governments?
- 6 How should copyright and intellectual property issues be addressed?
- 7 What measures are needed to support Canadian cultural and other content-based products and services?
- 8 What controls, if any, should be placed on the information that is put on the network?
- 9 How can the Information Highway be used to improve government services to the public?
- 10 How can personal privacy and security of information be protected?
- 11 How can we ensure that Canadian information industries take full advantage of the R&D and technological development opportunities presented by the Information Highway?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?
- 13 How can Canadians be assured of universal access to essential services at reasonable cost?
- 14 What consumer awareness and learning opportunities should be provided to enable Canadians to be effective users of the Information Highway?
- 15 What opportunities does the Information Highway present to improve government operations?

In debating issues, members came away with a deeper appreciation of the challenges facing Canada. All share the belief that if Canadians are to compete effectively on the global Information Highway, they need to embrace learning and be more competitive, innovative and creative. The Canadian cultural dialogue must be strengthened in order to reaffirm fundamental values that unite and define us as citizens.

The Council represented a diverse range of interests. Members came from telecommunications, broadcasting and information technology industries and institutions, from the artistic, creative and educational communities, and from consumer and labour organizations. They came together in five working groups to which 26 *ex officio* members were added.

five
working
groups

Remarkable consensus was reached on difficult questions of public policy. Inevitably, there were areas of disagreement. Nevertheless, members came to share an increased respect for differing perspectives and a willingness to transcend the interests of a particular community in order to address the broader interests of Canada.

As Canadians, we are in the midst of a technological revolution that will transform our individual lives and our entire society. If we are to seize opportunity, we must anticipate change and exploit both the economic and cultural potential of new information technologies. Canada has tremendous advantages in this regard – our expertise, resources, talent and technology. In building on these, we must preserve our values as a society.

The following summarizes the Council's report, major themes and messages drawn from the more than 300 recommendations made by the Council to the government. No summary, however, can do justice to the breadth of issues debated or to the depth of feeling members had about matters so central to Canada's future.

THE NEW MARKETPLACE

Canada's success on the Information Highway depends on whether we can establish a competitive framework that unleashes creativity, innovation and growth.

the private
sector

In the new information economy, success will be determined by the marketplace, not by the government. Hence, the primary role of the government should be to set the ground rules and to act as model user to inspire Canadians. The private sector should build and operate the Information Highway. Those who make the investments should bear the risks and reap a fair reward.

competition

Canadians possess an increasingly wide range of communications options, including cable, telephone, satellite, off-air broadcasting and cellular. The Council believes that fair and sustainable competition is the best way to stimulate innovation and serve the interests of consumers. Fair and sustainable competition supports the public policy goals of choice and affordability.

convergence

The Council reviewed a recent report by the Canadian Radio-television and Telecommunications Commission (CRTC), *Competition and Culture on Canada's Information Highway*. The Council supports the move toward greater competition. Although Council members held differing views on some broadcasting issues, all agreed that in this area greater clarity in policy and regulation is essential.

Canadian
ownership

The Council considered the issue of Canadian control over the Information Highway and limits on foreign ownership. National ownership of globally dispersed operations is becoming more difficult to determine and less relevant in a global economy. The behaviour of capital becomes more critical a policy issue than its source. The Council recommends that foreign investment policies be reviewed. Any liberalization of the regime should ensure that firms, regardless of their origins, operate in a manner consistent with Canada's economic, social and cultural objectives.

regulatory
and policy
framework

The government's role is vital. The Council believes it should establish a clear regulatory and policy framework to encourage investment, economic growth and the creation of jobs for Canadians. Removing outdated and unnecessary regulatory barriers will help promote fair and sustainable competition, which in turn will stimulate use of the Highway and encourage network development and upgrades.

The government should act as a persuasive model user of new communications technologies and should build partnerships in technology and service delivery with the private sector and with other levels of government. Governments at all levels in Canada should “re-engineer” themselves using integrated, government-wide information and communications systems. Canadians should have access to responsive, efficient and cost-effective public services.

Government
as model user

A STRONG CANADIAN PRESENCE

New information technologies are changing the relationships between producers and consumers, and between governments and citizens. For Canada’s cultural industries, the Information Highway offers new opportunities to reach consumers all over the world, while at the same time presenting familiar challenges when it comes to connecting with Canadians.

While in the past the Government of Canada found it advisable to regulate cultural and intellectual content, neither the intent nor the effect of such regulation was to limit consumer choice. On the contrary, government policies have ensured a wide range of choices, balancing our needs as consumers with our priorities as citizens. In fact, Canada is one of the most open markets for foreign cultural products in the industrialized world.

choice

Culture is more than simply a product on the global market. It is also a fundamental national process: the ongoing dialogue focusing a diverse spectrum of perspectives into a shared vision of Canada. In endorsing the energetic promotion of Canadian culture, the Council calls for Canadian cultural policy to be reaffirmed and strengthened in relation to the new information infrastructure. Canadians must be able to provide and access their own content on the Information Highway.

promoting
Canadian
culture

To reflect Canada’s linguistic duality, the French language must have a prominent presence on the Information Highway. Government policies should stimulate, through appropriate incentives, the creation and production of new content and navigational tools to meet the needs of Canada’s French-language market.

French
language

role of the CRTC	Without the support of broadcasting and cultural policies and programs, Canadians would not have the range of choices currently available. The challenge now is to ensure that these policies are sufficiently flexible to accommodate change, yet reinforce Canada's stability in an unstable world. To this end, the Council recommends that the government confirm the important role of the CRTC in ensuring the implementation of long-standing cultural policy objectives for the Information Highway.
support for Canadian content	The Council believes that the contribution of new entrants should be equal to that of existing participants engaged in similar activities in the creation and distribution of Canadian productions. Creators of content must have equitable access to production funds, distribution opportunities and fiscal incentives. The Council recommends funding or tax incentives to encourage Canadian multimedia products, continued support for Canadian publishers and other cultural industries, and a strong role for the government in promoting export opportunities for Canadian content.
digitizing Canada's heritage	There is a need to "digitize" the important artifacts of Canada's history and heritage so that holdings in public galleries and museums are accessible to Canadians through new media. Digitization will benefit both the institutions and the public. It will make our cultural products more accessible to our children.
copyright	Since the <i>Copyright Act</i> came into force in 1924, copyright has been an essential economic lever for Canadian creators. Mindful of that, the Council made recommendations relating to multimedia works, browsing, fair dealing, Crown copyright and public education.
value for Canada	How people use the content on the Information Highway, and the value that content adds to their lives, are what matter. Canadians must be producers and consumers on the Information Highway. The more that content is provided by Canadians, the greater value it has for Canada. The Council made several recommendations to ensure that Canadians contribute to the global dialogue, that our cultural industries build on past success, and that Canadians continue to communicate and to prosper.

THE HUMAN DIMENSION

Access is a critical dimension of the public policy debate on the Information Highway. Basic access to the Highway should be as universal and relevant to Canadians as telephone and television services are today.

Canadians rank accessibility of services and content as one of their main concerns about the emerging Information Highway. The Council recommends that the government develop a national access strategy based on four policy principles:

- universal, affordable and equitable access
- consumer choice and diversity of information
- competency and citizens' participation
- open and interactive networks.

In an ideal competitive environment, prices should be market-based and services should pay for themselves. However, market forces occasionally fail to provide universal access at affordable prices. This may be the case in high-cost-of-service areas such as rural and remote communities or in the provision of services for Canadians with special needs, such as the disabled. Non-market mechanisms are needed to ensure universal access to essential Highway services at affordable prices. The Council stresses the importance of developing easy-to-use methods of accessing programs and services that reflect Canada's linguistic and cultural diversities.

Offensive content on the Information Highway presents complex issues for Canadians and their governments. Pornographic and hate materials are readily available on electronic bulletin boards and other services on the Highway. A balance must be struck between ensuring freedom of expression and imposing controls to deter harm, particularly to children. However, the difficulty is that no government exercises complete control over global networks.

The Council believes the government must inform the public that the rule of law applies equally to the Information Highway. It must bring stakeholders together to develop appropriate technology and codes of behaviour that address moral concerns.

principles

ensuring
universal
access at
reasonable
cost

offensive
content

privacy

The Council believes that Information Highway services should extend at least the same level of security and privacy to Canadians as telephone and mail services. Businesses, public institutions and governments gather and transmit vast amounts of personal and business-related information across national borders, without the consent of affected individuals. To ensure the protection of privacy rights of Canadians in the information age, the Council believes strongly in the need for national framework legislation to apply to government and private sector alike.

public key infrastructure

To provide an adequate legal basis for the security of electronic communications and business transactions, the Council recommends that the government deploy a Public Key Infrastructure – a certification network to sustain electronic commerce. This is part of the legal and practical infrastructure essential to Canadian participation in a digital environment and a global economy.

employment and the workplace

The government's first objective for the development of an Information Highway strategy is "creating jobs through innovation and investment." Already, Canadians see the emergence of new skills and new kinds of jobs and work arrangements. They know they can expect job losses in some areas and gains in others.

The Council examined these shifts and shared the concerns of many Canadians. Can the new economy generate enough jobs to provide quality employment to all Canadians? Can Canada compete with other countries in which wages are lower and benefits non-existent? What will happen to the rights and protections that Canadian workers have acquired?

The Council struck a committee to articulate a common position. Two divergent philosophical approaches emerged. Some members believe that the government should be proactive, via legislative change and support for full employment as a primary goal in directing the transition to an information economy. Others believe that the government should be a facilitator, and place greater reliance on the market as the driving force and on the private sector to address issues relating to job creation, job loss and workplace impacts.

However, Council members agreed on the necessity to oversee employment issues specific to the new economy and to identify appropriate action where required. The Council recommends a high-profile advisory body to monitor and facilitate change and foster research on new forms of work and their impacts on workers and organizations.

The Council also advocates a review of labour legislation to ensure that workers in non-traditional arrangements enjoy the same level of protection as those in conventional workplace settings. In the workplace, workers need to be protected against the misuse of information, particularly with respect to surveillance. The Council also calls for a National Employment and Job Search Bulletin Board, which would make use of the new technologies to help Canadians find jobs and employers find skilled workers. More generally, the Council calls for a renewed social policy framework to support worker mobility.

Despite best efforts, the labour representative on the Council was not able to be part of the consensus reached by the Council. His dissenting view and recommendations are appended to this report.

THE KNOWLEDGE SOCIETY

Learning and training comprise an integral part of the knowledge economy. Canada will provide an environment for lifelong learning in which all Canadians will have access to the widest possible variety of learning opportunities and tools.

vision

In the new global economy, where knowledge is the key resource, the quality of the nation's human resources is critical to competitiveness. For this reason, the Council adopted the principle of "lifelong learning as a key design element of the Information Highway." The route to prosperity in the knowledge economy is for workers to make intelligent use of information. Learning must span our working lives. Technology will make that possible.

lifelong
learning

In Canada, annual expenditures on formal education add up to approximately \$50 billion. Full-time registrants in formal learning and training represent one quarter of the Canadian population. In

an
economic
issue

the new formal and informal learning environments, technology-based learning tools have already proven more effective in certain learning situations and more cost-effective. Learners contribute to the knowledge economy both as purchasers and users of the new technologies.

learning and training products

The Council believes Canada should use its strengths in telecommunications and broadcasting, and in distance learning and education to establish itself as both supplier and user of high-quality learning and training products and services on the Information Highway. The integration of technology and learning is creating business opportunities for Canadians in course-ware development, course delivery and other software applications. The challenge for the government is to ensure that Canadian content is seen and used by Canadians.

new markets

If they can harmonize their approaches to new materials and curricula, provincial and territorial authorities will create economies of scale for software tools. This will provide a foundation for the production of technology-based learning products and services for both domestic and international markets.

a national strategy for learning

The Council recommends the development of a comprehensive national strategy involving the provinces, territories and other stakeholders to increase the effectiveness of learning and training on the Information Highway, so that Canadians will have access to, and will benefit from, new learning technologies.

educators

Appropriately trained educators, trainers, librarians and school administrators can assist all learners to maximize opportunities offered by the Information Highway. The Council believes learning organizations need to be restructured and professional skills need to be adapted in order to meet the requirements of the new learning environment.

NEW OPPORTUNITIES

role of the private sector

The private sector should lead Canada's research and development (R&D) effort on the Information Highway, particularly in new technologies and applications. There is also a critical role for the government.

By ensuring a robust business environment and by supporting R&D and applications development for the Information Highway, the government will speed the deployment of a Canadian Highway and allow Canadian technology and services to develop export capability. The government has a key collaborative role to promote innovation in R&D and applications development through its operations and government laboratories. An excellent collaborative example is the Canadian Network for the Advancement of Research, Industry and Education (CANARIE).

role of
government

The Council considered the advisability of federal tax-related support for R&D. It concluded that this method of support allows industry to drive projects and pays for itself over time in economic benefits. Given the importance of the Highway to all sectors of the economy, the Council recommends the expansion of tax credits for R&D investment in information and communications technologies.

tax
support
for R&D

Canada needs to enhance its influence in international standards development and to use standards strategically to advance Canadian industry and product development. To this end, the Council recommends that the government endorse open interconnection standards supported by international standards bodies and by *de facto* industry fora, and encourage government-industry partnerships on standards development.

standards

The Council identified several application areas that would enhance the quality of life of Canadians, reduce costs to governments and stimulate industrial development. There are timely opportunities to develop applications in health, education, electronic publishing and electronic libraries.

applications

Individuals and communities stand to derive great benefits from the deployment of networking technology for health care. A balance must be struck between research access to health data and protection of privacy. The government should support pricing structures to promote educational use of telecommunications facilities and provide incentives for the electronic publishing of scholarly information. Canada's large research granting bodies should immediately demonstrate leadership and disseminate research

health care,
education,
electronic
publishing,
electronic
libraries

results throughout the Canadian research community. To begin to digitize Canada's heritage assets in libraries, galleries and museums, pilot projects should be undertaken jointly with the public and private sectors.

The Council believes that if Canada minimizes regulation, creates a robust business environment for R&D and seizes opportunities in building specific applications that serve Canadian purposes, its efforts will be repaid through the creation of new businesses, products, services and jobs.

WHERE ARE WE HEADED?

The Information Highway is a manifestation of a deep and broad technological change causing major institutional change in all segments of our society. The Council believes its work has shown that change can be managed to the common benefit of Canadians. To do so will require goodwill and concerted action by the government, private sector and individual Canadians.

The Council's work reflects the following themes:

- | | | |
|---------------------|---|--|
| competition | 1 | Fair and sustainable competition should be the driving force behind the Information Highway; regulation should ensure an open market, a Canadian presence and a fair game. |
| urgency | 2 | Industry must move rapidly to build Canada's connections to the Information Highway. For its part, government must move to articulate and implement a national strategy for the Information Highway. |
| content and culture | 3 | Canadians and their governments must attach renewed priority to promoting Canadian content and culture on the Information Highway and to creating new jobs in the process. |
| economic engine | 4 | Use of the Information Highway in all sectors of the Canadian economy will improve competitiveness and create new opportunities for Canadians in global markets. |
| innovation | 5 | Innovation is the key to growth in the knowledge-based economy. R&D in information technology is critical to innovation on the Information Highway. This in turn will foster productivity, and thus growth and jobs. |

- | | | |
|---|---|----------------------|
| 6 | The Information Highway should be at least as accessible, affordable and relevant to Canadians as telephone and television services are today. Wherever the marketplace creates inequities of access for Canadians or barriers to access to Canadian content, problems must be addressed through public/private sector collaboration and, where necessary, government intervention. | access |
| 7 | Canadians need to create a learning culture within the new knowledge-based society. This is imperative for economic success, the empowerment of individual Canadians and the enhancement of their quality of life. | a learning culture |
| 8 | Strategic investments can ensure that the Highway and its applications make Canada's health and education sectors models for the rest of the world. | health and education |
| 9 | Individuals must remain at the forefront of the information revolution, and their interests and rights, especially in the areas of security and privacy, must be protected. | security and privacy |

Canadians are at a turning point in history. Our challenge is to make a confident, positive choice toward a more civil society, to seize the new tools of the information revolution and to employ them to the advantage of every Canadian. It is in this spirit that the Council offers the following messages to readers of this report.

To government:

- *Foster an environment in which the private sector can be innovative and create wealth and jobs for the benefit of all Canadians.*
- *Address market imperfections by ensuring a prominent place for Canadian content and culture as well as equitable access for Canadians to the Highway, both as users and as providers of content.*
- *Set an example as a model user of information and information technologies and use the power of government procurement to help Canadian firms compete globally.*

To the private sector:

- *Adapt to the new world of the Information Highway and its credo: Firms that invest in technology and people will prosper; those that do not will fail.*

To each of us as individual Canadians:

- *Get involved as users of information technology and take charge of our own education and training. Regard the Information Highway not as a threat but as an opportunity to enhance our lives and distinctiveness as Canadians.*
- *Determine the kind of society we want to live in and ensure that this vision is reflected on the Information Highway as we work for the values we care about.*

A final comment: The issues that the government put before the Council are central to Canada's future. Council members hope that in the months and years ahead, the national dialogue launched through the Council will be continued with the same sense of commitment and even greater vigour by all Canadians.

FOREWORD

Connecting Ideas

In the Speech from the Throne on January 18, 1994, the Government of Canada announced it would develop a Canadian strategy to address the challenges of the Information Highway. In April of that year, the government released a discussion paper titled *The Canadian Information Highway: Building Canada's Information and Communications Infrastructure*. That paper identified 15 policy issues – posed as questions – raised by the development of the Highway, ranging from its pace of development and ensuring access at a reasonable cost, to promoting economy-wide competitiveness and supporting Canadian cultural content.

To gather advice on those issues, the Honourable John Manley, Minister of Industry, established the Information Highway Advisory Council. He named as its Chair David Johnston, former Principal and Vice-Chancellor of McGill University and now Professor of Law at McGill's Centre for Medicine, Ethics and Law. The Council held the first of 15 monthly meetings on May 5–6, 1994.

THREE OBJECTIVES, FIVE PRINCIPLES

In its discussion paper, the government stated that the Canadian Information Highway strategy should be based on three policy objectives:

- creating jobs through innovation and investment in Canada
- reinforcing Canadian sovereignty and cultural identity
- ensuring universal access at reasonable cost.

In addition, the strategy should be guided by four operating principles:

- an interconnected and interoperable network of networks
- collaborative public and private sector development
- competition in facilities, products and services
- privacy protection and network security.

In recognition of the Highway as a tool for “providing new dimensions for learning, creativity and entrepreneurship,” which would become the title of the Council's interim report in November 1994, the Council added a fifth principle to the government's four: lifelong learning as a key design element of the Information Highway.

The 29-member Council represented a wide range of interests – the telecommunications, cable television, broadcasting, information technology, and cultural and multimedia industries; information institutions such as libraries and research organizations; the artistic, creative and educational communities; and labour and consumer organizations.

The Council, ever conscious of the need to see Canada's linguistic duality reflected in the nation's Information Highway, sought to do the same in its membership, its discussions and many of its recommendations.

HOW THE COUNCIL WORKED

In order to examine the government's 15 issues, the Council established five working groups, to which another 26 *ex officio* members were added, for a total of about 10 members for each group.

Each group was assigned issues specific to its mandate. Each undertook consultations and, where necessary, called upon outside experts to prepare and bring forward reports and position papers and to propose recommendations. In addition, special task forces were set up on growth, employment and competitiveness and on competition and regulation, and a subcommittee was established on copyright. Each working group's recommendations received three readings at Council and were voted upon. After each of its meetings, the Council made public its approved recommendations.

Because many issues were of interest to all working groups, discussions and consultations between them became integral to the process: business leaders discussed cultural and educational issues with creators, film producers and educators; and creators confronted bottom-line questions about global markets, competition and investment and access.

On complex issues that cut across working groups, the Council established bridging committees. This approach was used to find common ground on convergence, copyright, personal communications services (PCS) and the impact of the Highway on jobs and the workplace.

Where issues fell within the domain of provincial governments – as with education and health care – the Council called upon *all* levels of government to endorse national priorities and to consult, coordinate and engage the many players within and outside the government.

THE FIVE WORKING GROUPS AND THE ASSIGNMENT OF THE 15 PUBLIC POLICY ISSUES

Competitiveness and Job Creation

- 1 How fast should the advanced network infrastructure be built?
How will network improvements be financed?
- 2 What is the proper balance between competition and regulation?
- 5 How can the federal government coordinate its activities with other governments?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?
- 15 What opportunities does the Information Highway present to improve government operations?

Canadian Content and Culture

- 2 What is the proper balance between competition and regulation?
- 3 Should requirements for Canadian ownership and control of communications networks be reviewed?
- 6 How should copyright and intellectual property issues be addressed?
- 7 What measures are needed to support Canadian cultural and other content-based products and services?
- 8 What controls, if any, should be placed on the information that is put on the network?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?
- 13 How can Canadians be assured of universal access to essential services at reasonable cost?

Access and Social Impacts

- 8 What controls, if any, should be placed on the information that is put on the network?
- 9 How can the Information Highway be used to improve government services to the public?
- 10 How can personal privacy and security of information be protected?
- 13 How can Canadians be assured of universal access to essential services at reasonable cost?
- 14 What consumer awareness and learning opportunities should be provided to enable Canadians to be effective users of the Information Highway?

continued

Learning and Training

- 14 What consumer awareness and learning opportunities should be provided to enable Canadians to be effective users of the Information Highway?

Research and Development, Applications and Market Development

- 4 How quickly can Canadian industries move toward universal standards, and how should these standards be determined?
- 11 How can we ensure that Canadian information industries take full advantage of the R&D and technological development opportunities presented by the Information Highway?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?

The Council's recommendations are addressed to the government as the recipient of its advice, but the reader should not take this to imply that the government should be *the* driving force in building the Information Highway. Except as one of the largest users and, therefore, a persuasive role model, governments in Canada should allow the private sector to do what it does best – invest, innovate and create jobs.

FIVE WORKING GROUPS

Competitiveness and Job Creation

Consumer, labour and small business representatives joined industrialists to focus on issues concerning the pace of development of the Highway, the balance between competition and regulation, and economy-wide competitiveness. This group provided advice on the government's role in procurement and the use of technology. It also led the development of Council-wide responses on such issues as personal communications services and convergence – the move from regulated monopolies to sustainable competition in the telephone and cable industries.

Canadian Content and Culture

This group included representatives from Canadian broadcasting, cable and telephone companies as well as Canada's cultural industries, among them

artists and creators. It focused on issues concerning the need to maintain a dynamic Canadian cultural production industry and to strengthen Canadian culture as part of the Canadian identity, and on matters of foreign ownership and copyright.

Access and Social Impacts

This broadly based group of business and community interests involved in access to information also included operators of community networks. It focused on issues including the definition of universal access to services and its economic practicality, the need for privacy and security, and offensive content and consumer awareness. The group also looked at the issue of using the Highway to improve government services. In addition, it led a Council-wide discussion on the employment and workplace impacts of the Highway.

Learning and Training

Educators and trainers, content producers, developers and users of learning materials carried out consultations on how to ensure that learning is at the centre of the knowledge-based economy for a bilingual and multicultural Canadian population. The group approached learning as a policy issue of national importance, requiring federal and provincial coordination and consultation. It concentrated on learning opportunities to enable Canadians to become effective users of the Information Highway. Because the Council formulated learning as a fifth operating principle, the group also made supplementary recommendations on issues before other groups.

Research and Development, Applications and Market Development

Represented in this group were public and private sector communications and information technology R&D organizations, as well as industrialists and educators. The group focused on how Canada's information industries can take full advantage of R&D and technological opportunities presented by the Highway and on the roles of industry and government in setting standards. The group also looked at the organization of the government's science and technology activities, and identified specific applications of information technology in health and education and in institutions such as libraries and museums.

THIS REPORT

The challenge of the emerging Information Highway for Canada is presented in the introductory chapter. Five chapters follow that are devoted, respectively, to the perspectives and key recommendations of the five working groups. Unresolved differences are noted. In particular, the Council member representing organized labour was not able to agree with the Council's workplace and employment recommendations, and his dissenting report and recommendations are attached as Appendix IV.

Chapter 7 on implementation presents the Council's major themes of its recommendations and report. As well, the Council offers its central messages to governments, the private sector and individual Canadians. Chapter 8 presents all the Council's recommendations, supported by explanatory notes.

References in the report to the Council's recommendations are in parentheses and numbered in relation to the 15 issues posed by the government. Thus, (Rec. 1.2) corresponds to Issue 1 and the second recommendation under that issue.

In many ways, the Council reflected the diversity of Canada itself. As with any national dialogue, ours was marked by a healthy tension. Determined to speak with a coherent voice to Canadians, the Council believed its task was not so much to eliminate this tension, but to manage it creatively and sensitively in the pursuit of common goals.

We wish to express our gratitude to those who took the time to share their ideas. Many provided written comments, connected to the Council on the Internet, or participated in meetings or conferences with Council members. These views helped shape the Council's advice. We are also grateful for the support provided by the members of the Council's Secretariat. Despite long hours of hard work, their dedication and professionalism were exemplary. We also owe a substantial debt to the "sherpas," the public servants from various departments who worked so diligently on behalf of the five working groups. To all the aforementioned, thank you.

CHAPTER 1

The Information Highway

TRANSITION TO A KNOWLEDGE-BASED SOCIETY

Before they head out to work every day, Canadians turn on the radio or television to get an update on the weather or road conditions, or perhaps to scan the headlines. On their way to work, some drop off their children at school. Students with computers in the classroom will log on and pick up the latest messages from pen pals in Trois-Rivières, Prince George or even Sapporo, Japan. At lunchtime, their parents may stop by an automated teller machine to pick up cash, or buy tickets to a hockey game at a commercial kiosk, or perhaps use a government automatic teller to renew their vehicle permit. Then it's back to the office where they retrieve a document faxed to their computer for weekend reading. On their way home, a cellular telephone call settles the family's Friday night video choice – a movie that will be transmitted to their home over cable television.

These Canadians are all travelling the Information Highway. Hardly an exotic phenomenon of the future, the Information Highway is already part of our lives.

Indeed many of us already possess, and use, an “on-ramp” to the Highway, whether via bank machines, pay-per-view television or business utilities such as video conferencing. Even the most sophisticated interactive connections today will become commonplace tomorrow, ever more integrated into almost every facet of our daily lives.

Perhaps the brightest promise of the new Highway technology is that it offers a chance for all Canadians to be part of the mainstream.

For some, this is already happening. In 147 communities in rural Newfoundland, interested individuals can access St. John's Memorial University's Teleconference System and link up to 217 different health education user groups.

WHAT IS THE INFORMATION HIGHWAY?

So, what is the Information Highway? It is all that has been discussed before, and more. The term flows from the convergence of once-separate communications and computing systems into a single global network of networks. It also refers to the content carried on these electronic networks. Finally, as an integral part of the Information Highway, the software intelligence available will enable users to navigate pathways to a whole universe of information.

Nowadays we still use distinct systems for various services, such as telephone, cable and satellite systems and computer networks.

Each of the communications industries built transmission systems for its particular type of communication, developing its own route into homes or offices:

- Telephone companies built two-way, point-to-point **narrowband** networks using mainly copper wire.
- Cable companies built **broadband** channels using mainly coaxial cables and fibre optic trunk lines, which provide the greater capability needed for video transmission. But, unlike telephone systems, their networks were built for one-way communication only.
- Computer networks were originally designed for transmitting data within and between organizations.

As recently as the late 1970s, North American computer equipment executives were sceptical of the potential for computers in the home. However, in the past 15 years, the phenomenal increase in the power of computer chips, accompanied by a similarly dramatic drop in prices, has seen computers evolve from large mainframe machines to personal computers to the latest hand-held devices. Today, 40 percent of Canadian households have personal computers. One third of these are equipped with modems – devices that allow computers to send and receive information over telephone lines. Computers are slowly being introduced into schools: the number of computers in classrooms for students up to Grade 12 now averages one for every 15–20 students.

Two forces of technological change have created a shock wave through the communications and computing industries and shaped the blueprint for the Information Highway. In telecommunications, transmission has evolved from copper wire to fibre optic cable, along with a new generation of telecommunication switches and embedded software. The virtually limitless capacity of optical fibre has substantially eliminated capacity or bandwidth (i.e. the number of signals that can be squeezed into a wire or cable) as a constraint. Moving the

large amount of information required for videos or X-ray imaging has become increasingly rapid and cost-effective.

The second technological breakthrough is “digitization” – the conversion of text, sound, images, video and other content into a common digitized format. This is what is referred to as “convergence.” Digitization makes it possible to connect *all* communication systems into a single, vast network.

The challenge facing Canada is to capitalize on these breakthroughs to integrate our telephone, cable, satellite and wireless networks into an **interoperable network**, and to upgrade them to fully interactive broadband capabilities that will carry information efficiently to Canadians across the country and beyond. The creative challenge is to develop electronic applications, services and content that will inspire people to use the Highway and realize its full benefits.

HOW DO WE ACCESS THE HIGHWAY?

In its simplest form, we can see the Information Highway in objects that are as near at hand as the telephone, television and personal computer. We also see the Highway in the form of communications networks. The best-known electronic network is the Internet, a dramatic illustration of how the new communications technologies have become more accessible. Once the preserve of research scientists, the Internet is now used by tens of millions of individuals in their businesses and everyday life. The Internet is really a series of computer networks with a single point-of access that connects the user to an electronic information system spanning the globe. The user can retrieve scientific information, explore “chat groups,” find movie clips, listen to songs, view pictures from a museum, read a book, sell a report, choose a ski vacation or preview the newest cars. The practical – and commercial – uses of the Internet are enormous and increasing daily.

Canadians have been quick to participate in the Internet, with their growth rate in using it among the fastest in the world. Many access it through commercial networks, others subscribe to community FreeNets. Supported by donations and the hard work of members, these local networks lease lines and equipment from a commercial facility and provide Internet access free of charge to members.

There are nearly five million computer hubs on the Internet, with the number of users worldwide estimated at between 30 and 40 million.

The Internet was originally designed as a network for emergency communications in the event of nuclear attack.

Still, the Internet is but a first glimpse of the Information Highway. Services such as secure electronic payment remain in their infancy. There is as yet limited provision to address public concerns such as network security or privacy protection. The most common access point is a computer with a modem hookup. When computer networks can be linked equally to television, telephone and other networks to form a “network of networks,” the Information Highway will become a more significant part of our daily lives – an evolving mix of the old, the new and the yet-to-be invented.

WHAT'S IN IT FOR CANADA?

Every technological advance is accompanied by hopes for a brighter future. In envisioning the Highway's potential to improve the quality of life for Canadians, the Council found itself using words like “catalyst,” “empowerment” and “enrichment.” These words echoed those expressed in times of previous dramatic advances in communication – the telegraph, telephone, radio and television. People said then what we are saying today – what matters is not so much the new hardware as how people use it, and the value it adds to their lives.

Canada's Competitiveness

The Council believes that Canada's Information Highway will be key to improving Canada's competitive position. It is essential for a successful transition to an economy in which jobs and wealth are based on the creation, movement and application of information.

The Highway affords enormous potential for promoting regional development. For example, New Brunswick has moved aggressively to promote itself as a centre for the application of new communications technologies. “The wired province” has been successful in attracting global firms to locate there and, as a result, has realized significant employment benefits. Firms throughout the economy, not just those in the computing and telecommunications industries, are finding out how computers and telecommunications can improve productivity, sales and growth. “Just-in-time” delivery to market shaves turnaround times, reduces inventory costs, lowers prices and generally better serves customers in a global market. Businesses use electronic communications to send in data from the field to a central computer, conduct training programs in remote locations and provide mobile, two-way communication between employees. Buying and selling on the Internet is still in its infancy but could well spawn a whole new retail sector.

The information and communications infrastructure is vital to an innovative economy. Fortunately, Canada's communications infrastructure is world-class. We launched the world's first geostationary domestic communications satellite, and today its successors transmit telephone, television and data signals across the country and around the world in several languages. Despite the adversities presented by our geography, Canada's penetration rates of telephone and cable service are among the highest in the world.

Canada has world-class communications: 99 percent of Canadian households have telephone service — a fraction of a percentage point more than those who have colour television — and 79 percent of the 96 percent of Canadian households with access to cable subscribe to it .

Canada's Information Industries

The information technologies sector is an important contributor to Canada's information and communications infrastructure. This sector's total revenues in 1993 were \$50 billion, contributing 7 percent of gross domestic product. The industry features some of Canada's — and the world's — most prominent companies offering telecommunications equipment and services, computers and office equipment, software and computer services, instrumentation, microelectronics and consumer electronics.

Among the fastest-growing sectors in the economy, Canadian information technologies feature internationally renowned expertise in robotics, data communications and switching, network computing, geographic information systems, remote sensing and graphics software. The global market for information technology products and services exceeds US\$1 trillion and will double by the year 2000.

By using the Highway, Canadian cultural industries and content providers can reach consumers around the world. Canadians have received international recognition in publishing,

Industry Canada is working with provincial and territorial ministries of education and other stakeholders through SchoolNet to ensure that by 1998 all Canada's 23 000 schools, libraries, universities and colleges are connected to the Information Highway.

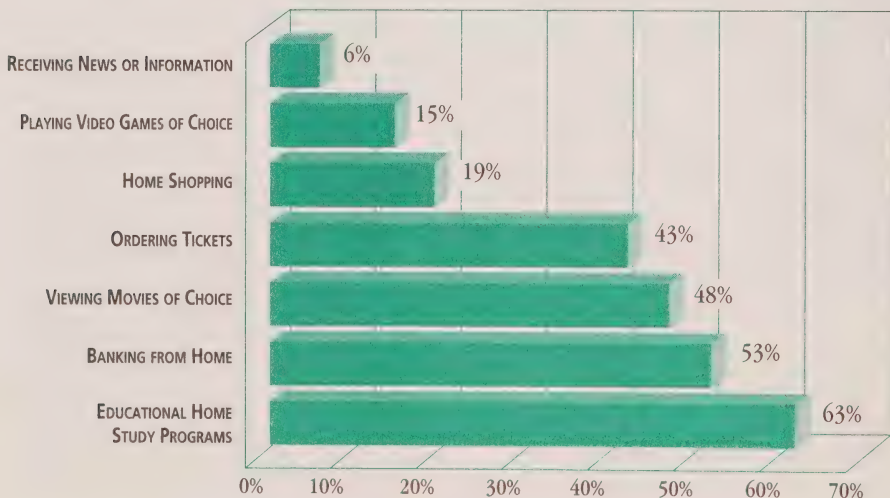
music, film and television and, along with success on the Information Highway, Canadian talent can continue to flourish at home *and* succeed globally.

However, past achievement does not guarantee future success. In the race to integrate and upgrade Canada's electronic infrastructure and generate new forms of content, the future of our telecommunications, broadcasting and information technology industries is at stake. No longer is there any technological barrier to Canadian communications firms competing in the carriage and provision of *all* digital information and services.

In this new environment, companies are moving quickly to strike alliances breaking down traditional industry boundaries. Nowhere is this more true than in the industries that build and supply the Information Highway. Former competitors choose to become partners, believing that delay serves only to erode their market share and efforts to keep skilled workers going to new entrants or the trans-national multimedia giants acting in partnership with software and other content creators and major service providers.

Choice and Opportunity

As consumers, Canadians are beginning to perceive value in the Highway and are contemplating the possibilities of "connection." A survey of Canadian attitudes toward the Information Highway reported the highest level of interest in the following seven services:



Source: Andersen Consulting Survey, March 1995.

Some industry analysts believe current research underestimates market potential because many of those who will benefit from the range of services yet to be developed are in their 20s or younger.

Since it will be the consumer who ultimately pays for and uses the new services and products, care must be taken to ensure that:

- access is affordable and user friendly
- privacy and security are assured
- content meets Canadian needs and wants
- consumers are informed and protected.

WHY SHOULD THE GOVERNMENT BE INVOLVED?

The pace of technological change and the new paradigms created by the information revolution will affect how citizens and their governments conduct themselves. Facing growing fiscal pressure, governments have no choice but to use information and communication technologies to improve productivity and service and save money. As users of the Information Highway, governments have an important opportunity to modernize and reform the critical social infrastructure of education, learning and training, and health care that has given Canadians their enviable quality of life.

The market is a powerful force for progress. Competition breeds innovation and innovation leads to productivity, growth and jobs. The market comprise people who, through their choices as consumers, express their interests. Those already connected to the Highway and who see its benefits are the enthusiasts. But what these electronic producers and consumers want for themselves is not necessarily what society as a whole might choose. Canadians have worked hard over the generations to give expression to equality and opportunity – values that must be preserved. The challenge for Canadians in this new electronic age is to avoid creating new divisions in society between information “haves” and “have-nots.”

For the government of Canada, there is no choice but to be involved, its first responsibility being that of establishing the ground rules and then ensuring that there are appropriate enforcement mechanisms. As such, the government can either slow or accelerate the pace of change.

Competition and Regulation

Historically in Canada, **telecommunications** has been regulated to meet economic and social objectives, largely in terms of providing service that is non-discriminatory and universal. By contrast, **broadcasting** has been regulated through the allocation of the airwaves as a public good and in an effort to enhance, not only economic and social objectives but also cultural objectives related to national identity. This was the “contract” that underlay the award of monopoly privileges to telephone and cable companies.

Today, countries around the world are liberalizing their telecommunications and broadcast regulatory regimes. In Canada, a new *Telecommunications Act* was proclaimed in 1993, completing the legislative agenda that began with the update of the *Broadcasting Act* in 1991 and the revision of the *Radiocommunications Act* in 1989. Competition has been introduced into the long distance telephone market. The issue of rate rebalancing (reducing cross-subsidization of local telephone service price from long distance revenue) is before the CRTC.

Since long distance telephone services were opened up to competition in 1992, the industry estimates that competition saved its customers \$800 million. This saving is projected to rise to \$1.3 billion by the end of 1995.

The imminent introduction of Personal Communications Services (PCS) and further deregulation will increase competition and consumer choice. The investment challenge of the Information Highway and the desire of consumers for more choice cannot be met without a quick move from monopoly toward fair and sustainable competition.

This was the main thrust of the May 1995 report of the CRTC titled *Competition and Culture on Canada's Information Highway: Managing the Realities of Transition*. Also known as the “convergence report,” it proposed rules to govern the move toward competition between cable and telephone companies and the introduction of video-on-demand and other new services.

The convergence report recognized that Canadians do not want to jeopardize their long-standing economic and social goals – in particular, universal access to broadcasting and communications services – in the new information economy. Similarly, the report acknowledged that when it comes to promoting

Canadian culture and identity, a balance must be struck between market and non-market considerations.

Meeting Cultural Policy Objectives

Canada has a unique political and cultural landscape: we are a bilingual country with a small population – and therefore a small market – stretched along an open border adjacent to the United States, a country whose cultural and entertainment industry dominates not only the Canadian but also the global markets. The cultural objective of ensuring access to Canadian content becomes an even greater challenge in the new global environment of the Information Highway.

Linking Canadians to a global system of interactive media creates at once opportunity and threat to the promotion of Canadian cultural content. Canadian artists and cultural industries will find new and better promotion and distribution channels to help them reach their audiences in Canada and around the world. Yet maintaining and promoting a distinctive Canadian cultural presence will continue to be a challenge. Increased competition and choice cater to us as individual consumers, yet this individualism also presents challenges for our collective agenda.

Another hurdle is that greater access to information can lessen our security and personal privacy. Again, we are reminded of the role of the state in preserving values essential to a civilized society.

Concepts such as copyright, fairly well-established in the world of print and publishing, are harder to apply in a still-unfolding digital world. It is the very nature of the Highway – its evolving, expanding structure and presence – that produces a two-sidedness to almost every issue surrounding it.

CONCLUSION

The Information Highway will shape the future of our nation. Governments, businesses and individuals alike must spell out how the Highway can work in our common interest. The challenge is formidable. There will be enthusiasts and sceptics; both sides must be heard if we are to create a strategy that benefits all Canadians.

As a metaphor, the term “highway” suggests a physical structure on which we can carry “things.” Canadians know how our country was connected as a physical and political entity by transportation infrastructures such as the Canadian Pacific Railway or the St. Lawrence Seaway. These were “highways” that moved goods and people. But Canadians also know that we have built our country with networks like the Canadian Broadcasting Corporation, which carry information and ideas. The power of the Information Highway as a metaphor lies in our seeing it as a new infrastructure around which to evolve a new sense of

The Information Highway Advisory Council worked and communicated in French and English. Through its Internet access point (Internet: council@ic.gc.ca) and conventional media outlets, it was able to elicit comments from both linguistic communities. Its findings, reports, minutes and recommendations were published simultaneously in both official languages on the Net and in hard copy.

community and nationhood, as Canadians become more creative, innovative and entrepreneurial. Just as a transcontinental railway had its “last spike” in linking a nation at the time of Confederation, the Information Highway is a “next spike” in defining Canada at the dawn of the third millenium.

The government put 15 policy issues before the Council. We, the members, offer this report in reply and invite Canadians to “connect” their ideas on these critical issues with ours.

CHAPTER 2

Competitiveness and Job Creation

THE NEW MARKETPLACE

All over the world, there has been an ever-increasing demand for better, faster and more affordable communications. Canada's success on the Information Highway will depend on whether we can establish a framework for its development, one that will unleash our creativity and innovativeness. If we have the necessary foresight and boldness to push forward, then economic growth and jobs will follow.

The most effective way we can respond is to move away from regulation and rely more on market forces. The convergence of once-separate information technologies and industries has an "enabling effect" that will stimulate industrial development throughout our economy. Canadian firms using the technology, products and services of the Information Highway can improve their competitiveness on a global scale and create jobs at home. So too can governments in Canada look to the Highway to improve services and reduce costs. It is these themes – increased competition, new jobs and better government – that comprise the framework for the recommendations of the Working Group on Competitiveness and Job Creation.

Duthie Books, which has six stores in Vancouver, has a Virtual Bookstore. Users can search and order 50 000 titles in 150 subject areas and get information on new releases, book awards and articles.

Through its Internet site, Duthie also coordinates *The Reader*, an electronic journal of reviews and announcements, and *Literascape*, an on-line centre for book-related materials and services.

THE CHALLENGE: "WHO WILL BUILD IT? WHO WILL COME?"

The Information Highway is a work-in-progress. Canada already has part of the technological infrastructure in place: telecommunications networks, cable television, satellite and other wireless systems, and computer networks such as the

Internet and FreeNet. These facilities provide Canadians with converging services and applications, for example, broadcasting, telephone, data and other communications services.

In this field, it is the marketplace that should determine winners and losers. The Council supports the government policy to establish a competitive environment for the development of the Highway (Recs. 1.3 and 12.4). This is consistent with the government's goal to preserve and expand fair, vigorous



Source: Preliminary documents relating to *Building a More Innovative Economy*, Industry Canada, July 1994.

competition, within a framework that, while not protecting individual firms, does not lead to the extinction of any particular sector. Canada's infrastructure builders face challenging, multifaceted goals – to rapidly deploy the new technologies, upgrade and develop interactive (broadband) networks, and integrate different networks into a seamless “network of networks.”

TIMING AND FINANCING ISSUES

The public and private sectors here and abroad are cooperating to refine policy frameworks guiding the development of the infrastructure of the Information Highway. In the transition from the old economy to the new, emphasis shifts from resources and physical infrastructure to people and ideas. To keep pace with the rest of the world, Canadians must rapidly invest and innovate.

Regardless of the technological opportunities, building Canada's new communications and information infrastructure will be costly. However, the door to the knowledge society will open wider, depending on decisions taken regarding when and how much to invest in infrastructure construction and upgrades and in the development of new information services.

Because the financing of the Information Highway should be left to the private sector, the firms and individuals who bear the risks of these investments should also reap the rewards (Rec. 1.2). Suppliers – telephone, cable television, content and other service providers – make investment decisions on new hardware, applications and services, based partially on general economic conditions and expected returns. Their decisions also hinge on the degree of uncertainty – or certainty – conferred by the telecommunications and broadcasting policy and regulatory framework, which includes specific financial and service obligations as well as the rules affecting ownership and licensing.

Balancing supply and demand for products and services will largely determine how, and how fast, the Information Highway will evolve. On the demand side, user content ranges from E-mail and educational course-ware, to movies-on-demand and electronic commerce. As the number of users increases, so too will the range of available content. Put simply, the more people will be willing to pay to use content, the faster the Highway will evolve.

Even as Canada makes the transition from monopoly to a competitive environment, regulations and policies must be clear and consistent as well as stable and predictable. One shortcoming of the existing framework is the lack of a uniform national regulatory regime. For instance, telecommunications services in Saskatchewan are not under federal jurisdiction. The Council recommends that such geographic gaps in regulatory jurisdiction be eliminated (Rec. 2.2); otherwise the rollout of new nation-wide services will be inhibited.

Regulations among governments in Canada governing the establishment of network facilities and services can also be confusing. For example, different levels of government have different requirements for the placement of cellular radio towers. The Council recommends that municipal, provincial and federal licensing and regulatory requirements be coordinated and streamlined (Rec. 2.8b).

COMMENTS ON THE CRTC'S REPORT ON CONVERGENCE

In May 1995, the CRTC released its report on convergence, *Competition and Culture on Canada's Information Highway: Managing the Realities of Transition*. The Council struck a bridging committee to identify issues that merited a response and to develop recommendations in reply. Before making any final decision, the government thereby has the benefit of the CRTC's report and the Council's response.

The CRTC's report addressed the issue as to when and under what terms telephone companies might offer significant competition in the cable television market. The report has suggested that regulatory proceedings are already under way and that technological developments and market forces will provide a transition period of three to four years. The CRTC's position, therefore, was that there was no value in *fixing* a transition period to competition. Instead, during the transition period, government should aim to remove barriers and invoke competitive safeguards before telephone and cable television companies begin competing in each other's basic market. The CRTC estimates that it will require 12 to 18 months to put these safeguards in place. During that time, local telephone competition and rate restructuring issues will also be resolved.

The Council agrees that setting arbitrary timetables for the building of the Information Highway is inappropriate. The private sector – users and providers – will, and should, drive the pace and scope of development. Balancing supply and demand is a self-reinforcing dynamic. Regulatory frameworks, which also affect this dynamic, should therefore emphasize competition and choice, rather than monopoly and protection.

The Council believes competition is all-important in hastening the development of the Information Highway in the best interest of producers and consumers in Canada. There is an overriding sense of urgency to move ahead with competition (Rec. 2.15); thus, the Council endorses a move toward greater competition in all lines of business on the Highway where competition is viable and sustainable (Rec. 2.6).

Remaining monopoly services should not be permitted to practise cross-subsidization between competitive and non-competitive services. Therefore, the Council recommends accelerating the move toward price-cap regulation and away from rate-of-return regulation (Rec. 2.9).

The Council believes the CRTC should make every effort to meet the targets it set out for the transition to competition in local telephone and licensed cable television. The Council agrees with the need to address, as a prerequisite to permitting all firms to enter into all lines of business, the following five issues (Recs. 2.12, 2.13 and 2.16) identified by the CRTC:

- interconnection
- co-location
- unbundling
- rate restructuring
- interim number portability.

The Council believes that neither cable nor telephone companies should enjoy a head start in competing in the other's core business (Rec. 2.10).

Council members hold a range of views on the application of the *Broadcasting Act* to new programs and services on the Information Highway.

Some believe that the definitions in the *Broadcasting Act* should be narrowed to exclude those services that do not contribute to the objectives of the Act. This would provide the necessary certainty and clarity to encourage investment in new and emerging applications and services. In addition, these members hold that use of the exemption power is not a sufficient means for encouraging investment in new services.

Others believe it is important to maintain current definitions in the Act in order to ensure the continued presence and commercial viability of Canadian services on the Highway. Amendments to the Act would be premature, given

the uncertain nature of services yet to be developed. Rather, use of the exemption powers could allow for deregulation of services that do not contribute to the objectives of the Act.

The Council agrees that there should be greater certainty and clarity in determining which services should be subject to broadcast licensing or exemption requirements. The Council recommends the CRTC review the definition of “broadcasting,” provide illustrative examples and report back to the government in three months (Recs. 2.18 and 2.19). The CRTC has announced it will initiate a public process to clarify the use of exemption orders.

THE REGULATORY TRANSITION TO SUSTAINABLE COMPETITION

In the past 15 years or so, countries around the world have accelerated the shift from monopoly to competition in their telecommunications sectors. Competitiveness is indicative of international and domestic success. It stimulates innovation, expands choice and leads to greater economy-wide efficiency. In Canada, recent regulatory decisions on local telephone competition and reports submitted to the government on convergence and Direct-to-Home (DTH) satellite services have taken Canadian information industries further down the road toward sustainable competition.

The Council made specific policy recommendations on the introduction of two new components of Canada’s Information Highway: Global Mobile Satellite (GMS) systems (Rec. 1.7) and Personal Communications Services (PCS) (Recs. 2.20 to 2.27). The GMS recommendations tie Canadian equity rules to Canadian use of these international systems. On PCS, the Council put forward recommendations to promote competition and new entry into wireless services and to emphasize consumer choice, universal access, privacy protection and non-discriminatory access by third parties to the network. In addition, the PCS policy promotes job creation by favouring licence applications that commit to R&D expenditures in Canada. The Council was pleased to see the government accept these recommendations.

The Council recommends that the government, in liberalizing its regulatory framework for telecommunications, should act (Recs. 1.1 and 2.11) to remove outdated and unnecessary barriers to competition and implement safeguards against anti-competitive practices. Furthermore, a reformed regulatory system should reflect convergence and promote synergy by, wherever possible, integrating information industry regulations (Rec. 12.4b).

The Council recommends these specific regulatory changes:

- address lack of access to American and international markets by promoting competition in international telecommunications services based on a public proceeding to examine international bypass, and the use of Canadian facilities and foreign ownership caps (Rec. 2.5)
- provide fair access for multi-tenant buildings and municipal rights-of-way by ensuring service providers have access on fair and equal terms (Rec. 2.3)
- address the issue of inconsistent spectrum allocations and assignments by continuing to strive for consistent assignments across Canada that conform to International Radio Regulations and are protected from foreign interference, directions and control (Rec. 2.4)
- protect programming rights by developing regulatory measures to support such rights licensed to Canadian individuals and organizations (Rec. 2.7).

FOREIGN OWNERSHIP LIMITS

As a means of reinforcing Canadian sovereignty, the *Telecommunications Act*, the *Broadcasting Act* and the *Teleglobe Act* include provisions respecting Canadian ownership and control. In broadcasting and telecommunications, current regulations limit foreign ownership to 20 percent. In telecommunications, the limit on foreign ownership at the holding company level is 33 $\frac{1}{3}$ percent. As part of foreign ownership provisions and the Canadian ownership requirements in the *Telecommunications Act* (1993), Parliament introduced grandparenting provisions for two telephone companies, BC Tel and Québec-Téléphone Co. The Council considered whether the grandparented status of these companies should be extended to cover licences to operate broadcasting undertakings. No consensus was reached.

Foreign ownership limits are meant to promote Canadian control. They may, however, deny Canada access to the investment necessary to develop the Canadian Information Highway. As a first step, ownership regulations in the *Broadcasting Act* should be harmonized and liberalized with those of the *Telecommunications Act*, namely 33 $\frac{1}{3}$ percent at the holding company level (Rec. 3.1). The government has initiated a policy review in this regard. As a second step, in order to promote investment and competition in Canada, foreign ownership rules should be the same across federal communications legislation (Rec. 2.1).

The Council believes that with respect to investment, the behaviour of capital is more critical a policy issue than its source. The reason is that the national

ownership of globally dispersed operations is becoming more difficult to determine and less relevant in a global economy. The objective of retaining national sovereignty over the Information Highway could be realized by liberalizing foreign ownership limits to some degree, while at the same time ensuring that firms, regardless of their origins, operate in a manner consistent with Canada's economic, social and cultural objectives. Thus, the Council recommends that foreign ownership policies should be reviewed (Rec. 12.4c).

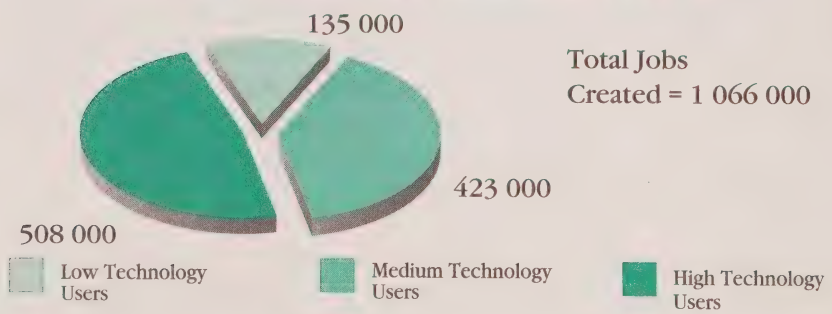
DELIVERING ECONOMY-WIDE BENEFITS

The information industry represents about 10 percent of Canada's national output. It is in the remaining 90 percent that uses the industry's products and services where the Information Highway will have a powerful transformative and beneficial effect in terms of improved production and new job creation. Accordingly, all levels of government in Canada – federal, provincial and municipal – should review their legislation, regulations and policies to identify and eliminate obstacles to the use and development of the Highway by individuals and firms (Rec. 12.1).

Economic opportunity is not limited to the supply sector. However, competition in that sector lowers costs of communications services, which enhances the ability of Canadian firms who use those services to compete domestically and globally. Competition reinforces a cycle of greater innovation, higher productivity, lower prices, higher quality and greater choice. It lays a new foundation from which all firms – large and small – can grow and create jobs.

TECHNOLOGY CREATES JOBS

Private Sector Job Creation, 1984–91



Source: *Building a More Innovative Economy*, Industry Canada, November 1994.

Generating new applications and content promises to be a major source of economic growth and increased employment for Canada. The emphasis should be on reducing impediments to the development and export of content products and services in which Canada has a comparative advantage. New approaches to promote Canadian content should be developed in a manner consistent with Canada's cultural objectives, the realities of a global marketplace and the economic opportunities of the Highway (Rec. 12.3).

Competition alone will not ensure the rollout of the Information Highway nation-wide. At the same time, how the issue of access will play out is uncertain – communities are moving quickly to establish local networks, which are helping deliver benefits to local economies. The challenge is to address those situations where Canadians are denied affordable access. The Council agrees that market forces should be the primary instrument for promoting access (Rec. 1.5) and that any intervention – such as subsidies – should be transparent and competitively neutral (Recs. 1.6 and 1.4).

THE ROLE OF GOVERNMENT

In February 1995, G7 countries, with representatives from both the public and private sectors, met in Brussels to discuss the implications of the Information Highway. As the regulatory regimes for communications services are liberalized, the private sector will be better able to meet the immense challenge of building and operating the Highway. G7 countries endorsed the principle of a collaborative effort between the public and private sectors to achieve a global Information Highway and make the transition to a knowledge-based society.

What is the role of the government? The Council sees the government's primary task as setting the legislative, regulatory and policy framework – in effect, the ground rules. Its other important, pivotal roles are:

- to coordinate related policies and initiatives within an overall strategy for the Information Highway
- through use of its power of procurement, to be a catalyst in building the Highway
- to be a model user inspiring all Canadians to participate and share in the benefits of the Highway.

Government as Coordinator

The first level of coordination is within the federal government itself. In early 1995, in response partly to a recommendation from the Council, the federal

government struck an interdepartmental committee (Rec. 5.1b). Next, because the Highway's potential impacts extend across jurisdictions, a second level of government-to-government coordination is required. Thirdly, Canada must participate in international initiatives to raise, discuss and resolve issues related to the development of a global network.

Federal, provincial and territorial ministers and officials whose portfolios impinge upon the development of the Highway should meet regularly (Rec. 5.1a). A formal mechanism for coordination and cooperation should be established. Furthermore, municipal, regional, provincial, territorial and federal licensing and regulatory requirements should be coordinated and streamlined in order to facilitate the development and dissemination of Information Highway facilities and services (Rec. 5.2).

International organizations are turning their attention to Information Highway issues. The absence of international coordination mechanisms addressing Highway-related problems – including implementation and access standards – could work against Canada's interests and hinder the development of a global Information Highway. The government should strengthen its linkages with existing international agencies and build on its international reputation for statesmanship by pursuing international initiatives such as meetings between national advisory bodies of the Information Highway (Rec. 5.3).

Government as Catalyst

Public procurement can be a powerful tool to stimulate scientific and industrial development. The Council urges that more be done – and done faster – to foster innovation, encourage participation by small and medium-sized enterprises and facilitate the formation of consortia to develop the Highway. This will create more commercial spinoffs, export opportunities and jobs (Rec. 15.6).

If the government disseminates its own information more aggressively and widely, the private sector will be better positioned to develop new applications and content (Rec. 12.2).

The government should appoint a deputy minister-level official to lead in identifying technology issues and developing solutions in consultation with government departments, key stakeholders and major trading partners (Recs. 9.20 to 9.22). That same official should have responsibility to “champion” and oversee the implementation of the Information Highway within the government (Rec. 15.3).

In November 1994, Industry Canada released a report, *Building a More Innovative Economy*, which discusses ways in which the government is using information technologies to meet economic and social objectives. The Council highlights the following two initiatives (already under way in collaboration with the private sector) as success stories:

- The Canadian Network for the Advancement of Research, Industry and Education (CANARIE), a not-for-profit organization, has 140 members from industry and the research and education communities. They have joined forces to accelerate the introduction of high-speed networks in Canada. More than 200 firms and research institutes across the country have already worked on CANARIE projects, with plans under way for more than 30 additional firms to join the consortium.
- SchoolNet, one of the leading educational networks in the world, is a joint federal, provincial and territorial initiative, which provides Canadian teachers and students with electronic services to stimulate the skills needed in the knowledge society. More than 4 000 of Canada's 16 000 schools are connected to the Information Highway through SchoolNet. The goal is to link all 23 000 schools, universities, colleges and libraries electronically by 1998.

The Open Bidding System, developed for the government by ISM Information Systems Management Corp., allows companies that seek to do business with the government to search on-line for procurement opportunities. Updated daily, the service offers access to tenders from Manitoba, Ontario and Alberta and the federal government. Some 25 000 businesses subscribe to the services at a cost of \$130 per year.

Government as Model User

The government has already begun to use the Information Highway to modernize and improve the way it operates and delivers services. In March 1994, Treasury Board released a discussion paper, *Blueprint for Renewing Government Services Using Information Technology*, with recommendations to enhance government operations and implement the electronic delivery of government services. Services such as electronic bidding, computerized income tax declarations and radio licence renewal are now in place or soon will be.

To make the government more efficient, cost-effective and responsive, the Council believes more vigorous and concerted efforts are needed to innovate, coordinate and implement new technologies throughout government departments and agencies. Accordingly, the Council recommends that the government adopt the following “mission statement”:

The government will make it a priority to become a world leader in the rapid introduction and generalized use of electronic information and communications systems, and in affording all Canadians the opportunity to communicate and interact electronically with its departments and agencies in either official language. (Rec. 15.1)

Revenue Canada offers EFILE, an electronic income tax filing service. Almost three million Canadians used the service for their 1993 tax returns. Clients receive refunds or notices of assessment in less than two weeks. EFILE has enabled Revenue Canada to improve its service and reduce administration costs.

The Enterprise Network, a Newfoundland Crown Corporation, operates an on-line network service to assist in the development of rural information industries, including home information technology applications such as telework, telehealth, tourism and education.

As a major creator, user and provider of information, the government must be a model in the timely and effective use of applications, products and services of the Highway (Rec. 9.11). It must instil a sense of urgency in making the transition to a knowledge-based society (Rec. 15.2).

Redefining the government's services for a digital environment will entail significant “re-engineering” within government departments and agencies. The benefits will be greater efficiency, lower cost of operations and faster, better services for Canadians (Recs. 9.1 to 9.4). The deployment of the Information Highway will speed the shift toward paperless communications and transactions. It will facilitate access to government procurement opportunities for small and medium-sized enterprises (Rec. 9.5); as well, services such as employment counselling can be

conducted over the Information Highway, thereby resulting in fewer visits to government offices. Lower costs of delivering social benefits and programs will produce savings and consequently more resources that might be used in pursuit of social objectives.

As the Highway is deployed throughout the government, evaluation mechanisms will be necessary to ensure cost-effective implementation (Rec. 15.4). Re-engineering will pose formidable technological, financial and, most importantly, human challenges. Increasing levels of automation and electronic service will create tension within established organizations, and government staff must be trained to exploit opportunity (Rec. 9.9). The merits of the technology must be readily understandable, and electronic service delivery programs must be accessible and user friendly (Rec. 15.5). What will work best is appropriately scaled, off-the-shelf, proven technology geared to users' needs (Rec. 9.10).

CONCLUSION

The Council believes that the necessary prerequisites to building a sound Information Highway in Canada are to update and reform the regulatory environment and move to sustainable competition and marketplace rules. As a consequence, the Highway will strengthen Canada's information industries and firms in other sectors throughout the economy, create a self-reinforcing cycle of innovation, growth and jobs, and provide for better government.

CHAPTER 3

Canadian Content and Culture

A STRONG CANADIAN PRESENCE

New information technologies are changing the relationship between producers and consumers and between governments and citizens. For Canada's cultural industries, the Information Highway offers new opportunities to reach consumers around the world, while at the same time presenting familiar challenges when it comes to connecting with Canadians.

While the government has found it advisable to regulate cultural and intellectual content, neither the intent nor the effect of such regulation has been to limit consumer choice. On the contrary, government policies have ensured a wide range of choice, balancing our needs as consumers with our priorities as citizens.

The challenges associated with ensuring a prominent place for Canadian content on the Information Highway are not new. As Canadians, we have always been confronted with the dual challenge of a small domestic market and our proximity to the United States, the world's most powerful cultural exporter.

Past federal policies have attempted to give Canadians a fighting chance in the cultural marketplace. These policies have been effective: 60 years ago we were a market for British, American and French cultures; today Canada is a major exporter of film and television products.

But culture is not simply a **product** on the global market. It is also a **process** – an ongoing dialogue that can focus a spectrum of diverse perspectives into a shared vision. In contrast to the robust existence of exportable products, the Canadian cultural dialogue within our borders is fragile.

Will the new technologies enhance our role as providers to the world or will we revert to the role of passive consumers? On the Information Highway, will Canadians drive an industry or will we become just another consumer group? Over the longer term, will the national dialogue that Canadians developed in this century continue to exist? Or will globalization, paradoxically, force us to withdraw into our conflicting individual, regional and ethnic shells?

The principal challenge is clear: How should Canadian public policy continue to ensure Canadian choices on the Information Highway? There are three fundamentals to consider:

- The Information Highway is a natural extension of the current broadcasting and telecommunications environments.
- In the face of ferocious competition from foreign sources, Canada's success is primarily due to its cultural and broadcasting policies.
- To ensure success in the future, cultural and broadcasting policies must adjust to the changing relationship between consumers and producers.

CANADIAN CONTENT AND THE INFORMATION HIGHWAY

There is much utopian speculation about the Information Highway's potential to "bring down borders" between nations. This sort of speculation must be tempered by the potentially negative effects of such eventualities.

The Canadian Museum of Civilization (CMOC) partnered with Kodak and Digital Equipment of Canada Ltd. to digitize the museum's collection. The CMOC site features a virtual tour of the museum's Grand Hall of West Coast Native longhouse facades, with totem poles and a forest backdrop. *The Great Adventure* lets children take a virtual tour around the world to experience images of different cultures (<http://www.cmcc.muse.digital.ca>).

Bringing down borders can lead to a blurring of national identities. It can enable large population masses to dominate smaller cultures and define the emerging "global culture" by sheer economic force. It can also rekindle old divisions – ethnic, regional, religious – which national cultures now transcend.

Respect for cultural differences is an essential component of civilized life. At the G7 Conference on the Information Society in February 1995, all participants supported the principle of encouraging

cultural and linguistic diversity. In international terms, the recognition and protection of cultural differences is an expression of good will. It is not about creating barriers; it is about tolerance.

Historically, Canada has nurtured its culture through a variety of measures, which include the following:

- direct assistance through programs such as those delivered under the auspices of the Canada Council and Telefilm Canada
- public institutions such as the Canadian Broadcasting Corporation and the national museums program to produce, distribute and showcase Canadian culture
- mechanisms such as the *Broadcasting Act*, rules for advertising in foreign media and rules governing split-run publications (where foreign periodical content is used as an advertising vehicle aimed specifically at the Canadian market).

Like the majority of Canadians, the Working Group on Canadian Content and Culture endorses the Canadian cultural imperative. Canadians must be able to provide their own content on the Information Highway. The aim of recommendations in this chapter is to ensure a prominent place for Canadian content on the Highway (Recs. 7.1 to 7.18). They take into account:

- fiscal restraints that confront governments at this time
- the need for Canadian business to compete internationally, free of outdated regulation
- the need to balance the interests of Canadians, both as consumers and citizens
- the international treaties to which Canada is committed.

Private Communication or Broadcasting?

Much effort has been expended to distinguish “broadcasting” from “communication.” While the distinction is by no means absolute, it is still valid.

Broadcasting is, at its core, the electronic provision of entertainment and information programming for reception by the public. Private communication, on the other hand, could be considered the exchange of ideas – by voice, text, data and visual images – between individuals. In broadcasting, it might be possible to establish a distinction between programs that are transmitted over the airwaves and those sent by wire, or based on whether programming is received via television or computer; however, these distinctions are of little consequence because they are all considered programming. That is not so with private communications.

This broad distinction remains and must remain valid despite converging technologies and exceptional instances. For example, as long as the Internet remains principally a private communication medium – used as a depository of databases and scientific information or as a promotional tool – regulating its content is no more appropriate than regulating the content for the telephone or, for that matter, publicity flyers. But if the Internet evolves into a medium for the commercial provision of programming, cultural policy goals will have to be set.

The Council believes the government stated a fundamental element of the Canadian Information Highway in its Order-in-Council of October 1994, which initiated a public process led by the CRTC on how to best frame a competitive policy for the Information Highway:

Participants in the Information Highway should make equitable and appropriate contributions to the production and distribution of and access to Canadian-cultural-content products and services; and government should continue to have the tools and mechanisms necessary to promote Canadian content.

Redefining the Regulatory Framework for Canadian Content

As was noted by the CRTC in its report on convergence, the *Broadcasting Act*, passed four years ago, “anticipated both the extraordinary pace of technological change and an explosion of broadcasting services in a competitive environment.” The CRTC went on to say that the legislation “held to the primary importance of maintaining a Canadian system that offers Canadians programming of high standards and one that, in its totality, reinforces the sovereignty of their country and their own cultural identity.”

Much of the success of Canada’s cultural industries has been a direct consequence of effective federal broadcasting and cultural policies. Where such measures have been absent, results have been disheartening. For example, Canadian feature films occupy less than 6 percent of theatrical screen time in Canada and rarely light up international screens. Canadian film artists, like their music industry counterparts a quarter-century ago, are more inclined to pursue their careers in the United States. For Canadians, the greatest achievement in film may yet be our contribution to the *American* entertainment industry.

In contrast, Canadian broadcasting policies have inspired Canadian talent to remain at home, while giving Canadian consumers the benefit of the widest possible choice of any country in the world. By any standard, the range is astonishing.

Simply stated, this wide range of choice would not have occurred without the support of strong broadcasting and cultural policies and programs.

Canadian cultural policy must be reaffirmed and strengthened in relation to

the new information infrastructure (Rec. 7.1). The challenge now is to ensure that these policies are sufficiently flexible to accommodate unforeseeable changes, yet strong enough to continue to provide Canada some stability in an unstable world.

Given the evolutionary nature of the development of the Information Highway and the proven adaptability of broadcasting policy to change, the Council believes the *Broadcasting Act* can continue to support the presence and commercial viability of Canadian content amid an increasing range of products and services. Accordingly, the government should confirm the important role of the CRTC to ensure the implementation of long-standing cultural policy objectives for the Information Highway (Rec. 7.2).

To reflect the linguistic duality of Canada, the French language must have a prominent place on the Information Highway. Thus, French-language products and services must continue to develop as an essential expression of Canadian content. Government policies should stimulate, through incentives, the creation and production of new content adapted to information technology, with special consideration for the needs of the French-language market. In addition, the creation, production and implementation of navigational and menu systems in both official languages should incorporate the principle of universal access by all Canadians to all forms of content (Rec. 7.3).

The Council had a divergence of views regarding the definitions contained in the *Broadcasting Act*. Some members believed the definitions should be narrowed. Others believed that the existing definitions in the Act were sufficiently flexible

In television services, Canadians are presented with a range of choices: public, private, community, French-language, English-language, multilingual, Native, Canadian and foreign, educational, specialty, pay TV, pay-per-view, and much more.

to accommodate new services and therefore should be maintained or interpreted broadly. There was concurrence that judicious use of exemption orders would make any such changes to the definitions in the Act unnecessary.

Nonetheless, some members still believe that the CRTC should evaluate services that are exempted from the requirement to hold licences so as to assess their potential to materially contribute to the objectives of the Act. Council members who felt that changing the definitions was unnecessary nevertheless believe that where services cannot contribute to the objectives of the Act, effective procedures, including timely exemptions of classes of services without obligations, must be developed.

Securing a Prominent Place for Canadian Content

The book publishing industry in Canada can provide essential content for the Highway and Canadian publishers must be given that chance. The value of book-based content multiplies with each new format or window. Publishers in other countries are at the forefront in developing electronic content, and Canada must find a foothold to compete.

Given the current precarious state of the Canadian book publishing sector, the government should put in place fiscal measures to support the financial viability of this industry until longer-term solutions emerge. Structural policies to ensure the industry's long-term viability should include investment incentives

as well as access to funds designated for multimedia programs (Rec. 7.4).

The University of Calgary is the home of CultureNet, an information hub for cultural activities across Canada. The site (<http://www.ffa.ucalgary.ca>) is a signpost to cultural information resources on the Internet in Canada, from architecture to literature and theatre. Searches can be made of databases such as the Canadian Music Centre Library, and of cultural organizations and their programs and member artists.

Two-way access – the ability to receive content and to provide content – is paramount. The importance of the *Broadcasting Act* cannot be underestimated. Section 3(l)(t)(i) of the Act requires distribution undertakings to “give priority to the carriage of Canadian programming services and, in particular, to the carriage of local Canadian stations.” The Council recommends that government policy continue to recognize

and implement measures that give priority to the services of Canadian programming undertakings and, in particular, ensure the pivotal role of local private and public radio and television broadcasters as key universal providers of Canadian information and programming services (Rec. 7.5).

While “shelf space” for Canadian content is essential, prominent shelf space at “eye level” for Canadian products and services is also important. Formal, enforceable access rules should be developed that strengthen the principle of priority carriage for all licensed Canadian programming services on all distribution systems, to ensure access to capacity, channel placement menus, navigational systems and ancillary capabilities (Rec. 7.6).

The *Broadcasting Act* calls for programming that reflects a wide range of views on matters of public concern. As companies merge to compete globally and benefit from vertical integration, measures will be required to discourage preferential treatment based on ownership. The principle of carriage/content separation should be maintained through, at a minimum, the requirement of structural separation between programming and distribution undertakings and other reasonable safeguards (Rec. 7.7).

Digitization and New Applications

Canadian public policy for the Highway has sometimes focused on infrastructure while allowing funding for content to dwindle. An example of this incongruity is SchoolNet, a program to link Canadian schools on the Information Highway. As it was being created in 1993, a funding program for course-ware fell victim to budget cuts. The unintended result is that SchoolNet may well become a conduit for providing American learning products to Canadians.

The artifacts of Canada's history and heritage must be digitized, so that they may reach new generations of Canadians. Because of current fiscal restraints, a collaborative approach should be adopted. To encourage investment in the digitization of collections, the Council recommends that governments solicit competitive bids from the private sector for licences to reproduce such works (excluding those protected by copyright) in digital form (Rec. 7.8). More generally, a portion of funds granted to heritage institutions should be earmarked for the digitization of collections, which would proceed according to the individual priorities of these institutions (Rec. 7.9).

MAKING CANADIAN-CONTENT PRODUCTS COMPETITIVE ON A WORLD STAGE

While government support is required to ensure a strong Canadian presence on the Information Highway, there is also a need to reduce reliance on that support. Canadian cultural industries should strive to be self-sustaining, in order to better position themselves in domestic and international markets.

Maximizing Opportunities

The Canadian market is not dominated to the same degree as the United States by giant media conglomerates. Canadian players are, typically, small and medium-sized private businesses. Canadian cultural industries require strategies to compensate for the difference in size with their American counterparts and to fully exploit potential domestic markets. Accordingly, funding should provide incentives to maximize the exposure of content products in different media and to maximize their potential in domestic and foreign markets (Rec. 7.10).

The important role of traditional cultural industries cannot be overlooked. For example, the Canadian film industry will not develop on the Information Highway without a proper base for growth. The industry's future viability depends upon more equitable access to distribution channels through Canadian movie theatres. Public policies must rectify this situation.

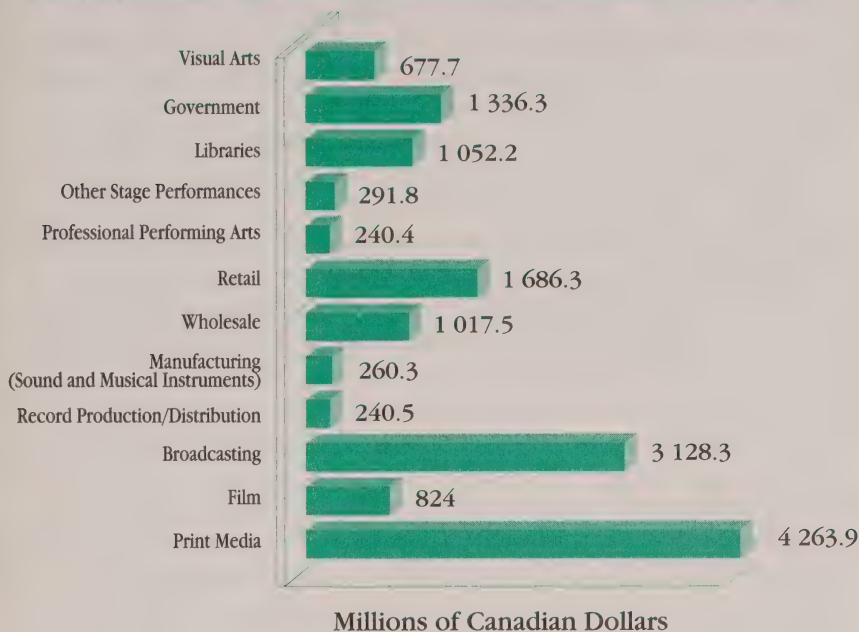
Although Canada's domestic cultural market is small, every effort must be made by Canadian producers to exploit it. In recognition of the important opportunities in the market for educational products and services, the Council of Ministers of Education Canada should be encouraged to urge its members to adopt policies (i.e. procurement and incentives) that foster the development and delivery of Canadian learning products and services (Rec. 7.11).

Without creators, there is no content. Creators must become adept at using new technologies for the production and distribution of their products, and educational opportunities should be made available to them (Rec. 7.12). Institutions should also encourage multidisciplinary research projects.

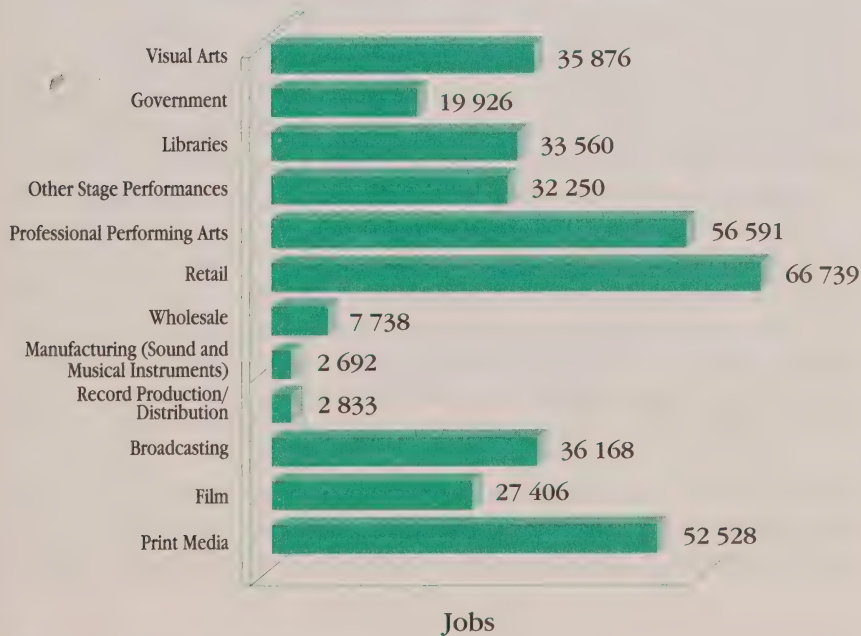
There will be a variety of non-cultural content on the Highway, including telecommunications services, data banks, health and information services, non-cultural multimedia products and software applications. Canada cannot stand out in all subsectors. Canadian companies must make strategic choices and concentrate in emerging and niche markets where there is maximum potential reward.

ARTS AND CULTURAL SECTOR

Contribution to Gross Domestic Product, 1992-93



Direct Employment in Canada



Funding the Production of High-Quality Canadian Content

In Canada, to the extent that the public has “paid the piper,” the public interest has “called the tune.” Public funding for Canadian content has helped offset the cost of achieving high standards. In return, the public interest has helped determine what is or is not high-quality programming. Now that public funding can no longer be provided at the same level, will the marketplace become the sole determinant of “quality” on the Information Highway? Will the public interest continue to play a role?

To promote the public interest, new ways must be found to direct resources to Canadian content. In recent years, private resources have been important to the production of high-quality Canadian content. The CRTC, for example, requires cable operators to fund the production of community programming. Many operators also contribute to the production of Canadian content. Television stations, specialty services, pay TV and pay-for-view services are required to target a large percentage of revenues for Canadian programming.

The Council believes that new entrants to the system should be expected to contribute equally to the creation and distribution of Canadian productions. Through the direct allocation of a percentage of revenues from the distribution in Canada of broadcast services, all distribution undertakings governed by the *Broadcasting Act* should contribute equally to the development and production of Canadian programming, including interactive multimedia products (Rec. 7.13).

Access to Financing

Equitable access to production funds, distribution opportunities and fiscal incentives is critical. Provided there are safeguards with respect to non-arm’s-length transactions, government policy should permit equitable access for broadcasters and independent producers – including multimedia producers – to production funds, distribution opportunities and tax measures (Rec. 7.14).

As previously stated, the government should continue to support Canadian publishers and other cultural industries and promote export opportunities for Canadian content. However, the government should also put in place new funding or tax incentives to encourage Canadian businesses to invest in new products, including Canadian content-multimedia products for the Information Highway (Rec. 7.15).

Taxation

One fiscal measure that has proven effective is Section 19 of the *Income Tax Act*, which keeps advertising dollars in Canada by disallowing the tax

deductibility of advertising in foreign print and broadcast media primarily directed to the Canadian market. The Council recommends that Section 19 be amended to apply to advertising in all electronic media, including new media applications such as electronic publishing and on-line services and, moreover, that it be properly and consistently enforced (Rec. 7.16).

Governmental Harmonization

Governmental harmonization will facilitate the production and export of Canadian programs, including film productions and multimedia. It will also encourage productions with countries where Canada has co-production treaties. As a first step, further federal/provincial harmonization must be undertaken to streamline the objectives of support programs and other incentive measures, as well as the rules and criteria of access to funding. As a second step, there should be similar harmonization between Canada and its treaty partners (Rec. 7.17).

Market for Rights

New American service providers would prefer **not** to regard Canada as a separate and distinct market. That commercial reality was readily apparent in issues raised by Direct-to-Home (DTH) satellite broadcasting. Given the disparities in economies of scale between Canada and the United States, the dominance of foreign programming in Canada and the potential fragmentation of our small market, the Council recommends that government policies continue to enforce a **discrete** Canadian marketplace for program rights and discourage the continentalization of such rights (Rec. 7.18).

COPYRIGHT

Since the *Copyright Act* came into force in 1924, copyright has been an essential lever to encourage creativity and ensure adequate compensation for creators. In this way, copyright has both benefited Canadian creators and proven important to the realization of Canadian cultural sovereignty and national identity. However, the new technologies – primarily digitization and interactivity – have provoked wide debate on how copyright should be applied and enforced on the Information Highway.

To examine the issue, the Council struck a subcommittee on copyright. Its report to Council was one of the first attempts to comprehensively examine copyright law and practice in the context of the Information Highway in Canada.

The potential for piracy, or unauthorized use and reproduction of protected works and the consequent economic repercussions, is a cause for concern to creators and producers. At the same time, users, service providers and

distributors of protected works on the Information Highway need to have a fuller understanding of the nature and extent of copyright liability as well as streamlined procedures for rights clearance.

In the search for a balance, the Council raised some of the complex questions to be addressed as digitization proceeds:

- How will existing rights apply to the creation and use of works in a digital environment?
- How will the moral rights of creators be protected?
- Who is liable for copyright infringement?
- How can the use and reproduction of protected works for the purposes of enforcement be tracked?
- How can the process of clearing rights, particularly for multimedia works, be streamlined?

In reply, the Council developed a set of principles (Rec. 6.1) to govern the application of copyright on the Information Highway, based upon these requirements:

- A balance should be maintained between the rights of creators to benefit from the use of their works and the need of users to access and use those works.
- Industry, creators and user communities should be encouraged to develop and implement an administrative and regulatory framework that is easily understood and not seen as a barrier to access or use of content.
- The need for creativity and the multiple roles of individuals as creators, disseminators and users of information should be recognized.
- The creation of works critical to national and cultural identity and economic development should be encouraged.
- Exchange of information should be facilitated.

The Council believes that these principles address, in an orderly way, issues raised by increased digitization and therefore set the framework for discussion among stakeholders. These principles will be useful to explain copyright legislation to the public and to facilitate legislation and regulations interpretation by creators and users as well as the courts.

There has been considerable discussion in the industry as to whether multimedia works are protected under the *Copyright Act* or whether they require the creation of a new category of works. The Council agreed that the digitization of works in itself does not result in the creation of new works; rather, it constitutes the expression of copyright subject matter in a different format. Accordingly, the Council is of the view that all digital works, including multimedia works, have sufficient protection under existing categories of works in the *Copyright Act* (Rec. 6.2).

The Information Highway permits users to “browse” works, including books, artwork, music, films, videos, live and recorded music, among others. Creators must retain the right to authorize or prohibit the use of their works, regardless of the technology or medium. Therefore, the Council believes it should be left to the copyright owner to determine whether and when browsing should be permitted on the Highway. However, in order to provide greater clarity to users, the copyright owner should also identify what part of his or her work is appropriate for browsing. To clarify these practices, the Council recommends that the *Copyright Act* be amended to provide definitions of “browse” and of “publicly available work” (Rec. 6.4).

“Fair dealing” is designed to be a valid defence for users in cases where an infringement has occurred. The relevant section of the *Copyright Act* should be clarified regarding its application in a digital environment. Specific criteria and guidelines should include explicit clarification that fair dealing applies to the making of an electronic copy of a work and to the storage and transmission of that copy by electronic means (Rec. 6.5).

The principle of ensuring that the Information Highway provides access to more, not less, information has renewed debate in Canada on whether Crown copyright should be abolished. In the Council’s view, what is required is not the abolition of Crown copyright, but rather a more liberal approach to making works of the Crown available to the public (Rec. 6.7).

Under current copyright law in Canada, bulletin board service (BBS) operators are liable for copyright infringement. Only common carriers functioning solely in that capacity are exempt from copyright liability. The Council accepts that

BBS operators should be liable for copyright infringement (Rec. 6.16) except where:

- they did not have actual or constructive knowledge that the material infringed copyright
- they acted reasonably to limit potential abuses.

Contrary to what might be expected, the issues presenting the greatest challenge to develop a truly Canadian Information Highway with new Canadian products and services were not legal or policy-related in nature, but administrative and technical. In that regard, the industry believes the enforcement of copyright and the clearance of rights constitute a priority.

The Council reviewed the range of mechanisms that could be developed to track and enforce copyright on the Information Highway. It concluded that the industry itself, with the assistance of the government, was best suited to develop the necessary technological solutions. However, the Council recommends that legislative action be taken to amend the *Copyright Act* to make it a criminal offence to tamper or by-pass copyguards or encryption technologies for the purposes of infringing copyright (Rec. 6.11).

Furthermore, the government should encourage the industry as well as creator and user communities to create an administrative system to streamline the clearance of rights for use of works in a digital medium (Rec. 6.12).

In summary, the Council believes the *Copyright Act* provides sufficient protection for new and existing works, including multimedia works, that are created or distributed in a digital medium. The current legislative and policy framework is sufficiently flexible to provide the means of effectively enforcing copyright on the Information Highway and, at the same time, provide users with reasonable access to protected works.

The Council's recommendations respecting copyright law and practice on the Information Highway are only a first step. Users, creators and the industry need to be better informed about the rights of creators and the needs and responsibilities of users. Accordingly, the Council recommends that the government, in partnership with industry and creator and user communities, should launch a public education campaign on the application of copyright on the Information Highway (Rec. 6.13).

CONCLUSION

Canadian broadcasting and cultural policies have never limited consumer choice. Rather, they have ensured the widest possible choice in Canadian and foreign content. In fact, Canada is one of the most open markets for foreign cultural products among industrialized nations. The Council supports the principle respecting access to, and diversity, of content adopted by G7 countries in Brussels in February 1995 at the conference on the information society.

"Citizens should be provided with access to all content, including a strong presence for indigenous cultural products and services. Diversity of content, including cultural and linguistic content, should be promoted." (Adopted by G7 countries at Conference on the Information Society, February 1995)

As Canadians, we find ourselves questioning assumptions about what the nation state is and what it is for; yet no alternative instrument has shown itself capable of maintaining the fundamental precepts of civility such as rule of law, without which private commerce cannot take place.

We cannot be certain what changes will occur as a result of the digital revolution. At the same time, we cannot wait for the outcome before mapping national strategies. Faced with this paradox, our challenge is to determine which traditions we can forgo in order to successfully address global changes, and which are essential to maintaining our integrity as a nation.

We must be continually prepared to address the fundamental Canadian question: *What constitutes Canada?* We must also ask ourselves: What are the essentials that make this nation viable as a society and, that enable us to maintain consensus, rules of law and a distinctive national identity?

If we are to reach a national consensus regarding our efforts on the Information Highway, broadcasting and cultural policies must not simply react to technological change, but they must also drive change. That is the fundamental imperative for a strong Canadian presence on the Information Highway.

CHAPTER 4

Access and Social Impacts

THE HUMAN DIMENSION

The Information Highway is not just about technology, nor are its considerations solely commercial. It must have a human dimension, so that its use, operation and impact respect and reflect the values that Canadians hold, both as individuals and as a society.

Even as the Highway permeates almost every facet of daily life, it must create opportunities to improve the **quality** of life. Canadians have always worked hard within their society to overcome differences of gender, age, income and other social factors creating barriers to equality.

But for some Canadians – like those living in rural and remote communities or those with disabilities – the reality of life involves a constant struggle to conquer isolation and vast distances. The Information Highway can change all that, creating opportunity where there was none before.

The Working Group on Access and Social Impacts listened to the hopes of many Canadians, not just those in isolated communities or those with disabilities, but also community leaders, aboriginal peoples, community networks operators, educators and librarians – Canadians who believe that promise can become reality.

The working group discussed three topics regarding Canada's Information Highway: access to facilities, content and services; how best to protect Canadians against offensive content; and how to ensure privacy and network security. In addition, it led a bridging committee on issues respecting the impact of the Highway on employment and the workplace. On all these issues, the group's challenge was to determine how best to apply established goals and practices in Canadian society to an uncertain future.

ACCESS

Government policy has made it clear that provision of the Highway's services will largely be determined by a competitive environment. The market can indeed deliver most services to a majority of Canadians; however, there will be instances where the market creates inequities of access. The use of non-market mechanisms must ensure, if possible, that **all** Canadians are able to use the Highway and derive its benefits.

According to recently published opinion surveys, which were confirmed by consultations undertaken by the Council, access to the Highway ranks high among the public's concerns. With this in mind, the Council recommends that the government develop a national access strategy (Rec. 13.1) based on four principles (Rec. 13.2):

- *Universal, Affordable and Equitable Access:* Basic access facilities for the delivery of Information Highway services should be locally available, at reasonable cost, regardless of location. There must be equitable opportunity for all, including people with disabilities and groups with special needs, to access and use the Information Highway.
- *Consumer Choice and Diversity of Information:* To the maximum extent possible, provision of services will be driven by market forces, so that consumers will be able to choose from a wide range of commercial and non-commercial information and services.
- *Competency and Citizens' Participation:* Canadians should be able to acquire a basic understanding and command of information technology to enable them to use and benefit from the Information Highway. The Highway must provide adequate opportunity for self-expression and participation in the information society and for the control of incoming and outgoing information.
- *Open and Interactive Networks:* Networks must offer full interactivity, interconnection and interoperability, as well as the freedom to provide, circulate and exchange information.

Universal and Affordable Access

In a genuinely competitive environment, the market determines prices, and services pay for themselves. However, market forces occasionally fail to provide universal access at affordable prices. This may be the case, for example, in high-cost-of-service areas such as rural and remote communities or in the provision of high-cost services for Canadians with special needs. Where

market forces can be shown to have failed in that respect, government intervention is required (Rec. 13.3).

Traditionally, in telephony, a system of cross-subsidies, hidden by system-wide rate averaging, has been used to ensure the availability of basic services across the country. However, in the more competitive environment of telecommunications, this is becoming less and less viable. Other non-market mechanisms to improve access to services might include universal service access funds, targeted subsidies or preferential tariffs. Their use, however, should be explicit, targeted and competitively neutral (Rec. 13.4). How these non-market mechanisms are to be funded is a matter for the government and the CRTC to assess through regular public hearings.

Marketing surveys assessing services on the Highway provide few clues about which ones will evolve into “basic services.” Residential telephone service was once considered a luxury. Eventually, as technology and the needs and expectations of telephone users changed, it became a necessity of modern life. Rather than engaging in prediction, the Council believes that it is advisable to let demand determine which services are essential. Only then should such “basic services” be considered by the regulator as candidates for universal service.

As a consequence, the Council recommends that there be periodic public reviews for defining and designating which services should be provided universally and to determine conditions under which provision might be accomplished (Rec. 13.5).

Access to Networks and Facilities

Universal access means that anyone should be able to contact anyone on any network, regardless of the point of access. Moreover, anyone should be able to access services common to all networks. The Council recommends that any public network joining the Information Highway should be fully interoperable and interconnected with other networks such that, regardless of their respective network connection, subscribers to the same service can reach other subscribers (Rec. 13.6).

Universal Access:
The public telephone system provides individuals access to anyone in the world with a telephone. To the user, the system — which consists of wireline and wireless connections — is “seamless.”

"Most northern and remote communities are less interested in obtaining state-of-the-art communication technology than in simply having an infrastructure that can support what most southern communities take for granted: telephone lines that can support fax and high-speed modem as well as programming that reflects their culture and their language." (Source: Submission to the Access and Social Impacts Working Group)

The minimum infrastructure investment required is the upgrade of that portion of the telephone networks where aging equipment limits the ability of users to conduct even basic telephone voice communication. There are an estimated 12.4 million residential telephone lines across Canada, which is three times the number of business lines. Of the total residential lines, there remain 300 000, or about 3 percent, that require conversion to single-party lines that can support touch-tone

services. This may seem inconsequential, but the fact is these multi-party lines are concentrated in rural and remote areas, where the telephone is often the only "lifeline" to the outside world.

The Council recommends that, as a minimum level of access to the public telecommunications network, these upgrades should be universally available at reasonable rates (Rec. 13.7). The CRTC has approved conversion programs and timetables to upgrade party lines in Canada. However, in rural and remote high-cost-of-service areas, these upgrades may not be commercially viable and may require support.

Though few services will meet the criteria for universal service, certain others ought to be provided to limited cross-sections of society or certain geographical areas. For example, there are sound economic development and social reasons to support the availability of libraries and educational and health care services in rural and remote communities. For dozens of communities in the far North, these services are accessible only by airplane. The Council recognizes that public policy may not guarantee individual connections; instead, access may be achieved by establishing public access points at schools, libraries or community centres. It may also be desirable to provide certain services on a universal basis to people with special needs, such as the disabled. The Council therefore recommends a special tariff policy to ensure affordable access to services deemed essential for people and communities with special needs (Rec. 13.9).

Access to broadcasting and telephone service is problematic for people living in rural and remote areas, particularly the far North.

Technology (such as the Anik satellites) and government support programs (such as the Northern Native

Broadcast Access Program) reduced costs and improved access. The advent of new wireless technologies, including Personal Communication Services (PCS), fixed cellular systems, Direct-to-Home (DTH) and mobile satellites can further close gaps in

communications and services, but, for now, at a dauntingly high cost. Hence, the Council recommends that the government continue to actively support the application and cost of wireless and satellite technology solutions in these communities through the regulatory process and programs such as CANARIE, Aboriginal Business Canada and the SchoolNet Community Access Program (Rec. 13.10).

Connecting the North, an interactive symposium held in 1994, linked about 500 aboriginal and northern participants from Yellowknife and Whitehorse with policy makers and industrialists in Ottawa to discuss the use of new technologies to assist Northerners to connect to the Information Highway while preserving their culture and traditions. One panel, a dialogue between Northern Canadians and Australian native peoples, featured the latest in satellite technology.

Canadians who do not have a computer at home must rely on public access points in order to access a variety of services. Dedicated public access points to the Information Highway should be as commonplace as public telephones, postal outlets and automated banking machines. Commercial and non-commercial networks – including community-based networks such as FreeNets, which are being used more and more across Canada – will also increase access to the Highway.

However, many community-based networks do not have stable funding. The Council believes, therefore, that there is a need to maintain funding support for shared public networks such as community, school and library nets and common-user access centres (Rec. 13.11).

FreeNets or CommunityNets provide an electronic meeting place for the exchange of ideas and information locally and, in a limited way, on the Internet. Access is available, without charge, to members via computers with modems, or in local libraries. Following the Canadian tradition of creating cooperatives, members contribute work and cash. There are 28 CommunityNets in Canada, with more than 150 000 members. CommunityNets are victims of their own success; busy lines often make it difficult to get through.

Canadians are comfortable with public libraries. In the new information age, libraries can play a new role in the provision of sophisticated technical assistance and mediated access to ever-expanding sources of electronic information and services. Initiatives such as SchoolNet can assist libraries in this role. The Council calls upon the government to develop and support pilot projects aimed at promoting libraries as public access points (Rec. 13.12).

Access to Services and Content

Electronic access to public services – such as income tax filing, employment counselling, driver's licence renewal – may come to be regarded as essential. Recognizing that not all content-based information services can or should be made universally available, the Council recommends that governments in Canada consider the following criteria (Rec. 13.13) to designate content-based services as universal or essential services, based on their importance to:

- Canadian culture and identity
- public safety, health care, administration of justice and government services
- lifelong learning and training.

If large sections of the population find networks and content-based services difficult to use, universal access policies may become self-defeating. This is exacerbated when access procedures and software vary from network to network or from service to service. Accordingly, public policy should support the design of user interfaces and the development of uniform, easy-to-use access methods that reflect:

- the linguistic duality of Canadian society
- the desirability of built-in access capabilities for the disabled (Rec. 13.14).

Service providers and terminal equipment manufacturers need to be sensitized to these needs.

Overcoming Barriers to Access

The use of the Highway in Canada must not create a society of information haves and have-nots. Initial surveys indicate, however, that there are already barriers to equal access – for example, more men than women use the Highway. Other barriers may be related to social factors such as age, income and language, producing undesirable disparities in participation and access to benefits. The Council believes further research is needed to identify inequalities (Rec. 13.21) and develop measures to reduce or eliminate them (Rec. 13.22).

For the disabled, Information Highway technologies represent an unprecedented opportunity for independence and self-reliance. Public seed money provided under the National Strategy for the Integration of Persons with Disabilities for research into adaptations of Information Highway products and services ends in March 1996. There is an ongoing need to provide such public funds (Rec. 13.15) since the private sector may not perceive sufficient economies of scale.

Newspapers for the Blind allows visually impaired Canadians access to its data-broadcasting service. Subscribers can download daily newspapers from across Canada to large-print format on a computer screen, then transfer the text to a voice synthesizer or convert it to Braille.

The disabled would be served more equitably if utilities and information service providers billed on a flat-rate basis or by the amount of data transferred. For example, a subscriber with disabilities connected to the telephone system may require an adapted technology. Charging on a flat rate basis, rather than by time used, would be fairer since it would not differentiate between traditional or adapted interfaces (Rec. 13.16). A forum within government should be established, so that persons with disabilities can inform and influence government policy (Rec. 13.18).

ILLEGAL AND OFFENSIVE CONTENT

There is an important distinction between communication deemed offensive and communication deemed illegal. Pornographic, obscene and hate materials distributed in digital form – on, say, electronic bulletin boards – are readily and widely accessible, using computer communications networks. Though easy to obtain, they are difficult to monitor and police. Of course, the rule of law applies with equal force to the Information Highway.

Canadians must strike a balance between maintaining freedom of expression, and promoting tolerance and imposing controls to deter harm to society and to individuals. Under the *Criminal Code*, for example, distributors of prohibited materials are prosecuted. Provincial legislation with regard to labelling or displaying requirements protects children from violent or sexually explicit material.

Different levels of government in Canada have different responsibilities regarding offensive content. Besides the *Criminal Code* and the *Charter of Rights and Freedoms*, federal responsibilities are also defined by the *Telecommuni-*

cations Act, the *Broadcasting Act* and the *Canadian Human Rights Act*. Provincial governments have film and video review boards that enforce local regulations, including the prohibition of certain content and age restrictions. Municipal governments have by-laws to license and zone “adult entertainment.”

Simon Fraser University’s School of Engineering developed a chip that allows viewers to control programming to include or exclude programs according to personal viewing choices. The Vchip, demonstrated at the G7 Conference on the Information Society in February 1995, encodes video films that have been rated according to selected standards, such as the levels of violence, offensive language or gratuitous sexual display. Viewers use the Vchip to set personal preference ratings and customize their viewing choices.

Should there be a “gatekeeping” function controlling what is available on the Information Highway? In that regard, is there a role for government and the public? Can the technology provide solutions? For its part, the Council advocated an approach involving the law, information providers, the public and technology itself:

The Law:

- Fine-tune existing laws to make them more applicable and enforceable in the changing world of global networks.
- There are problems of enforcement related to jurisdictional boundaries. What might be considered illegal in one jurisdiction may be deemed acceptable in another – hence, the need for bilateral and multilateral arrangements at the international level, dealing with harmful or illegal communications on global networks (Rec. 8.7).
- For Canadian owners, operators and users of electronic bulletin boards, clarify ambiguous legal definitions as to what counts as public or private electronic commerce (Rec. 8.2).

Information Providers:

- Encourage the development and adoption of voluntary codes of ethics and practices, including the introduction of dispute procedures (Recs. 8.4 and 8.5).

The Public:

- The government should educate the public and promote awareness that the rule of law applies to computer-mediated communications (Rec. 8.1).
- The government should encourage public support for community-based organizations active in combatting hate propaganda as a cost-effective measure in combatting prejudice on-line (Rec. 8.3).

The Technology:

- Encourage R&D investment in technical solutions to protect against offensive content and to assist in law enforcement (Rec. 8.6).
- The right and ability to control information coming into the home demands consideration. Adaptive filters, which permit multiple-user profiles, are designed to seek and find; the challenge is to modify them to seek and screen (Rec. 8.6).

PRIVACY

The interconnection of networks increases the flow of personal and business-related information. Existing data – including electronic transactions, credit records, financial accounts, educational, medical and driving records – may be

reused to develop comprehensive profiles of individuals or companies. These records can be sent across national borders and sold or integrated with other databases.

Manipulation of data may occur without the consent of the individual from whom it was collected. Moreover, the information is often used for purposes unrelated to those for which it was originally collected. Because of the enormous potential for abuse, there is a need for effective privacy protection.

Most governments in Canada have legislated privacy protection pertaining to their own activities. However, in this regard, the private sector is virtually unregulated; only Quebec has enacted specific legislation governing its private sector. The Council believes strongly that there should be national legislation (Rec. 10.2) to establish fair information practices on the Information Highway.

In this regard, the Council endorses the efforts of the Canadian Standards Association (CSA) to develop a voluntary national code (Model Code for the Protection of Personal Information). The government should continue to collaborate with the CSA as well as business, consumer organizations and other levels of government to implement the code and develop effective independent oversight and enforcement mechanisms (Recs. 10.1 and 10.2).

Industry Canada should establish a working group with representation from federal, provincial and community-based organizations to increase public awareness and understanding of personal privacy rights and issues (Rec. 10.3). The department should encourage the use of new technologies such as public key encryption and smart cards to permit greater personal control of information.

SECURITY

Security is a basic feature of any public communication infrastructure, fostering consumer confidence and economic opportunity and upholding democratic values (Rec. 10.8). It establishes the proper environment for the protection of privacy and confidentiality in the conduct of financial, medical and other sensitive transactions over the Highway.

The following issues need to be addressed:

- *Privacy*: keeping information confidential
- *Access Control*: allowing selected recipients access to information

- *Integrity*: providing assurance that information has not been altered during transmission
- *Authentication*: providing proof of the identity of the originator of information
- *Non-repudiation*: preventing a sender from denying having sent information.

The potential for electronic commerce to develop as an entirely new economic sector underscores the need for secure electronic commerce and privacy (Rec. 10.11). Free flow of trade and information on the Highway benefits electronic commerce. However, firms must be able to verify the identity of customers and other firms with which they are doing business. This could be done through a third-party Certification Authority – a certification network known as a Public Key Infrastructure (PKI), in effect a network or interoperable networks of connected Certification Authorities. The Council encourages the government, itself a PKI user, to take the lead in establishing a common independent Canadian certification authority (Rec. 10.14) and act as catalyst for the introduction of private sector services requiring security.

The government, in partnership with the private sector and privacy advocates, must encourage the development of uniform policies, standards and practices for use by PKIs in Canada. The Council recommends that the government review immediately legislation for its application to PKI (Recs. 10.13 and 10.15).

EMPLOYMENT AND WORKPLACE ISSUES

The government's first objective for the development of an Information Highway strategy is "to create jobs through innovation and investment." Jobs, as well as the many issues surrounding employment in the new information economy, were central to the Council's work.

Information technologies are impacting upon employment throughout the economy. Already, Canadians are seeing the emergence of new skills and work arrangements. They can expect new jobs and new kinds of jobs, but not without job losses in some traditional sectors. These changes will be particularly acute in the manufacturing sector, as new technologies demand higher levels of education and training as well as greater autonomy and decision making by individual workers.

Canadians – employers and workers alike – are adjusting to these new challenges with notable success. For example, in the automobile industry in Ontario and Quebec, it is precisely the demonstrated and potential capacity of the Canadian work force to learn and apply the new technologies that attracted recent major investments in manufacturing capacity.

At the same time, the public and decision makers remain understandably concerned about the longer-term implications for employment in an information economy. The issues raised, some of the most hotly debated of our time, have no simple answers. Will the new economy generate enough jobs to provide employment to all the Canadians who need work? How can Canada compete with countries where wages are lower and benefits non-existent, or where the capacity to invest in new technologies exceeds our own? Will our educational and training institutions be able to produce workers with the skills required for the new economy? If so-called lifetime careers are a thing of the past, what will happen to the protection and benefits that Canadian workers have already acquired?

Not surprisingly, these questions engendered considerable debate and elicited a broad spectrum of views within the Council. To assist members to coalesce around common recommendations related to employment and the workplace, the Council struck a bridging committee that drew from three working groups: Access and Social Impacts, Learning and Training, and Competitiveness and Job Creation. The Council also commissioned a far-reaching study (*Impacts of the Information Economy on Employment and the Workplace*, by Goss Gilroy Inc.), which put forward recommendations for consideration by the bridging committee.

Despite good will and the best efforts of its members, the labour representative on the committee could not agree with the consensus reached by the Council on employment and workplace issues. This member, who did not believe that the Council's recommendations went far enough to protect workers, submitted a minority report, which the Council appended to this report (see Appendix IV).

Different Approaches

Within the committee, there were two divergent philosophical approaches regarding the respective roles and responsibilities of government versus the private sector in dealing with the employment impacts of our changing economy.

The first approach was based on a commitment to **full employment** as a central policy goal of the government. It saw the government taking a proactive role in job creation, in mitigating job losses and in facilitating worker adaptation. Accordingly, it called for government- and employer-sponsored training programs, work sharing, phased-in retirement of older employees, and facilitation of worker mobility.

This approach holds to the view that legislative changes are required to ensure protection of workers in non-traditional jobs. Furthermore, new monitoring mechanisms are required to ensure these rights are respected. This approach also envisages an active role for governments in developing international “social charters” to promote social justice and equity in the workplace, for example, with respect to child labour.

The second approach is more **market driven**, assigning the government a role as a facilitator rather than a central actor in the information economy. Accordingly, the government’s responsibility is to create a flexible and innovative economic and regulatory environment conducive to investment and job creation by the private sector.

The belief is that to meet the challenge of global competition in the new information economy, firms should invest not only in new technologies but also in the training and retraining of employees. Because organizational structures will be flatter as a consequence of people working in teams rather than in traditional hierarchies, workers should be multiskilled and prepared to embrace the challenges and opportunities of continuous learning.

This second approach would exercise caution regarding the use of legislative and regulatory mechanisms to intrude into the workings of the economy and the labour market, and would be wary of international social charters.

Areas of Agreement

The aforementioned philosophical differences should not obscure the fact that there were important areas of agreement among a majority of Council members – notably on recognizing the critical contribution of employment to the wealth and quality of life of Canadians and of lifelong learning to a mobile and well-qualified work force. Members also agreed that the Information Highway must benefit all levels of society if it is to be accepted by Canadians as a vehicle for social and economic change. Members also agreed on the need for continuing research and regular dialogue among government, industry, labour

and other stakeholders in order to improve understanding of the economic, social and employment impacts of information technology.

To this end, the Council recommends the creation of a high-profile advisory body (Rec. 13.23) making use of existing resources where possible to:

- promote and support research on economic, social and employment impacts
- foster an ongoing exchange of information and dialogue among stakeholders
- advise governments and stakeholders in adapting existing labour policies and employment practices to the changing workplace environment.

The Council recommends that governments and other stakeholders cooperate to support research on the potential for job creation and public/private sector partnerships in education and training programs, and on ways to encourage firms and individuals to adapt to the new economy. To foster a better match between demand for new skills and the availability of workers with those skills, the Council recommends the creation of an electronic National Employment and Job Search Bulletin Board (Rec. 13.25).

More generally, the Council calls for a social policy framework in support of worker mobility (Rec. 13.26), which should include:

- the promotion of pension and benefits portability
- the removal of barriers to non-standard employment practices
- the facilitation of worker mobility across the country
- the promotion of employer-paid training and skills development to increase the skill level of the Canadian work force in the new information economy.

The Council believes that the legal framework for employment and the workplace is crucially important. There is a need for labour legislation to adapt labour standards to the new environment and provide protection to workers in non-traditional arrangements equivalent to the protection enjoyed by those working in more traditional settings (Rec. 13.27).

The Council believes it is essential to protect the privacy of workers. With respect to issues regarding workplace surveillance, the Council recommends that workers be protected against the misuse of information technology (Rec. 13.28).

Differences of views within the Council on the impacts of the Information Highway on employment mirror the diversity of opinion within Canadian society and point to the need for further research and dialogue. Nonetheless, there was broad agreement among Council members that employment, adaptation, and learning and training are central to the interests of workers and of Canada as a whole. The Council believes its recommendations constitute a solid and balanced basis for employers, governments and individual Canadians to act upon.

CONCLUSION

At the heart of the Council's discussions about the Information Highway and its social impacts was a desire to embody, in the Highway, respect for the human dimension and Canadian values. Of these, among the most important is privacy, for which national legislation is needed to apply to both private and public sector alike. Also important is the need to strike a balance between freedom of expression and protection against offensive content. The Council believes that voluntary codes of conduct and morality codes should be established at the community level.

Finally, the Council also signals the need for a national dialogue and public consultation to broaden public understanding and to help achieve the goal of access to the Information Highway for Canadians in every segment of society.

CHAPTER 5

Learning and Training

THE KNOWLEDGE SOCIETY

The Information Highway is part of the larger landscape of the knowledge economy. Change is a constant feature of that landscape. For some people, that invokes excitement, hope and possibility; for others, nostalgia, even fear. If Canadians are to embrace and welcome change, they must create a society that places learning at its very heart, and nourishes them in their personal and working lives.

We must demonstrate foresight, commitment and effort in designing the Information Highway, so as to put the tools of empowerment into the hands of individual Canadians.

With this in mind, the Council added a fifth operating principle to its mandate: *lifelong learning as a key design element* of the Information Highway. The opportunity to learn is essential for Canadians to manage successfully the transition to a knowledge-based society. The Highway provides an important means to that end.

The Council developed a vision statement on Learning and Training:

Learning and training comprise an integral part of the knowledge economy. Canada will provide an environment for lifelong learning in which all Canadians will have access to the widest possible variety of learning opportunities and tools in order to succeed in such an economy. (Rec. 14.1)

The question is, how does Canada get there from here? Education, historically, had a formal connotation. It was, in a sense, a ticket to employment, a requirement for a minimum standard of living. But education cannot continue to be limited by this formal structure or definition.

No longer do individuals have one career within a lifetime; they can expect perhaps three, even five different careers. In this respect, the Highway becomes an enabling tool for smoothing those transitions from career to career. The same transitions apply to our learning institutions. Schools, libraries, universities,

training institutions and the learning industry must become an integral part of the everyday lives of Canadians.

THE ECONOMIC IMPERATIVE

In the old economy, Canada's natural resources and physical infrastructure determined our comparative advantage. In the new global economy, knowledge is a key resource, and the quality of the nation's work force is critical to ensuring competitiveness. The key to this transition is for workers to make intelligent use of information. As this will increasingly be the measure of their contribution to the economy, learning must span their working lives.

Enablers in the New Economy

It is people who exploit technology, not the other way around. In the new economy, information will be collected, shared and processed faster and in new ways. As a consequence, the social structure and economics of organizations will change and management and employees must find new ways of collaborating. The nature of work itself will change. To cope with continual change, businesses must have employees capable of acquiring new knowledge and skills and able to challenge traditional procedures and responses.

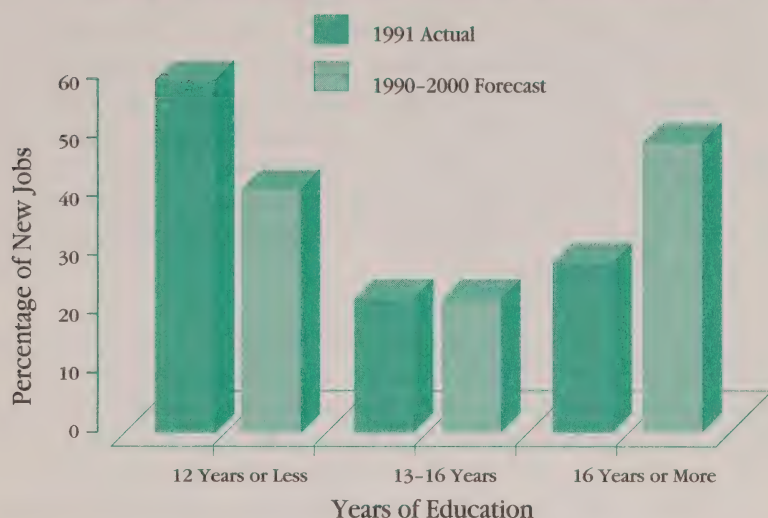
More than 30 000 National Bank of Canada (Mentor Group) employees from across Canada benefit from a range of training services delivered electronically, including learning materials, registration for learning programs and feedback from facilitators and trainers. The bank decreased employee learning time by 40 percent.

Canada cannot be complacent about the quality of its work force. An estimated 38 percent of Canadians lack the basic literacy skills required in today's workplace. Even more lack computer literacy skills.

In spite of the development of audio-visual and multimedia tools, including voice recognition technology, the acquisition of basic literacy and computational skills is more important

than ever. Higher levels of schooling, education and training will be required in the labour force if Canada is to realize continued economic growth. In the next decade, 50 percent of new jobs will require at least 16 years of education. Those Canadians who expect to remain in the labour market in the next couple of decades are immediately affected; many are likely to require retraining.

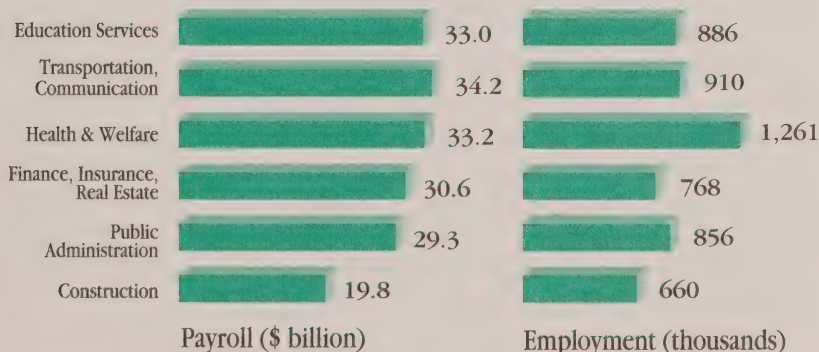
NEW JOBS REQUIRE MORE EDUCATION



Source: Employment and Immigration Canada, *Canadian Occupational Projection Systems*, 1993.

Experience has demonstrated that higher levels of formal education result in greater employability, further training and, ultimately, higher incomes. By contrast, the cost of the present drop-out rate from Canadian high schools is an estimated \$1 billion of net loss of output annually. This represents a staggering loss of future economic opportunities.

CONTRIBUTION TO GROSS DOMESTIC PRODUCT

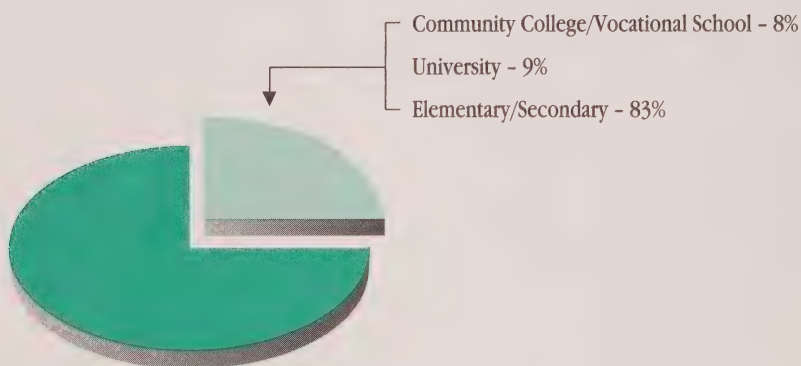


Source: Statistics Canada, *Estimates of Labour Incomes*, 1994 (no. 72-005); Statistics Canada, *Labour Force*, March 1995 (no. 71-001).

The Learning and Training Industry

As Canada keeps pace with the challenge of the global economy, its expenditures and activities devoted to learning must increase. The learning industry is already one the nation's largest economic sectors. Annual expenditures on formal education (excluding training expenditures or employer-based training) add up to approximately \$50 billion. Formal public and private education (excluding employer-based training) has a total payroll approximately equal to that of either the health and welfare sector or the transportation and communication sectors. Its payroll is larger than that of all levels of government in Canada combined.

Employment in the learning industry, including teachers and support staff, exceeds that of the government sector. As for its clientele, some six million Canadians, or about one quarter of Canada's population, are full-time registrants in formal learning and training programs.



Source: Statistics Canada, *Education Quarterly Review*, 1994, Vol. 1 (4) (no. 81-003).

More Efficient Learning

Technology-based tools are effective because they allow the learner and the source of information to interact. Unlike institutionalized education, where the learner must go to a classroom at an appointed hour, these tools can be adapted to the individual's pace and style of learning and can be used over distances and on demand. When indirect costs such as travel and time off the job are taken into account, technology-based tools are particularly cost-efficient and more so with increased usage.

The use of new computer-based technologies and related media formats will redesign learning and training methods. Given existing fiscal pressures to

reduce educational spending, governments and institutions will be forced to evaluate the benefits and costs of using new media learning technologies. Because of the indirect costs of time and travel, applying new technologies may well be more effective and less costly than producing traditional materials.

Indeed, for producers of learning materials, teachers, trainers and support staff, time is the highest cost of the learning and training process. Using the technology can make the learning process faster and more efficient, therefore cutting costs.

TeleEducation New Brunswick delivers classes in French and English for a variety of educational and training organizations in 26 communities across the province. More than 2000 students can access courses ranging from an astronomy class at Mount Allison University to health-care seminars at the University of New Brunswick.

An Emerging Technology-Based Learning Market

Canada has already established an international presence in the new economic sector spawned by the integration of technology and learning. A variety of Canadian firms have an international reputation for course-ware development, course delivery and other applications. Yet the global market remains largely unexploited; Canada should position itself to expand its industrial capacity and take leadership in niche markets.

The Canadian market for technology-based learning is itself small and fragmented. One main reason is that discrete markets are created by the fact that each province has its own educational system. Hence, Canada lacks a critical mass of users to sustain a viable domestic learning and training industry.

The more agreement there is between provincial and territorial authorities on new materials and curricula, the more economies of scale there will be to support the creation and marketability of Canadian software tools. To help create a critical mass of users for technology-based learning and training tools, the provincial and territorial governments should be encouraged to develop, with the private sector, full credit courses and to make them available to all Canadians (Rec. 14.9).

To build a foundation for the technology industry in Canada, training institutions and commercial trainers must form partnerships with technology develop-

The National Network for Learning develops projects to facilitate learning through technology. The network includes five provinces, four post-secondary institutions and three private-sector partners and develops programs aimed at creating radical improvements in mathematics and science achievement from the earliest school years.

ers. At the same time, to position the industry globally, government trade support and promotion should target Canadian learning technologies as a trade priority (Rec. 14.10).

Governments can also contribute to the development of a viable market by encouraging stakeholders to develop and use electronic clearing houses and networks, and distribution cooperatives and publications. This will enable participants to share best practices and information on available materials and suppliers and labour markets (Rec. 14.8). All governments in Canada need to

improve the national database on market characteristics and trends (Rec. 14.11), particularly with respect to household and employer-based training and non-credit learning and training.

LEARNING AND CULTURAL DEVELOPMENT

Learning and training are integral to the process of maintaining a distinctive Canadian presence on the Highway and promoting Canadian culture among Canadians themselves. The traditional view is that formal education provides the content as well as the social environment that together constitute the basis for expression and identity. Formal education also allows our children to learn important social skills for personal development and the sharing of common values.

Canadian workers, managers and professionals need Canadian-content training materials if they are to use the Highway. For example, construction workers need training regarding regulations and construction standards that prevail in Canada. In seeking ways to increase availability of existing training materials, the Council suggests that the educational and training materials developed by the provinces and territories be reproduced for the Highway and shared nationally.

The importance of the availability of works held by Crown copyright cannot be underestimated. The learning community and information production sector's

access to these works can be facilitated by the creation of an inventory and the negotiation of non-exclusive licences for digitization, processing and distribution (Rec. 6.10).

There is a variety of ways in which governments could better use existing support mechanisms and strategic powers to support the development of Canadian learning and training materials. The federal government should shift its focus of support from productions of traditional materials to those based on new media technologies (Rec. 7.22). Furthermore, the Council recommends that governments make more strategic use of procurement to encourage the development of Canadian-content learning and training materials (Rec. 7.19).

In addition, the CRTC should place greater emphasis on those sections of the *Broadcasting Act* that refer to educational programming, and, to fulfil the objectives of the Act, should allow for licensed distribution undertakings to make alternative forms of contributions to programming by way of learning and training activities (Rec. 7.23).

THE SHIFT FROM TEACHING TO LEARNING

Recent national public opinion surveys show that Canadians rank learning and education at the top of those services they want to see on the Highway. The Council's fifth operating principle underscores the importance for all Canadians to have ready, easy and affordable access to learning and training, both public and private sector-based, on the Highway (Rec. 14.2a).

Specifically, as a means of promoting access, the Council recommends that common carriers be encouraged to provide *special reduced rates for educational institutions* (Rec. 13.19). That this makes business sense is indicated by the willingness of computer manufacturers to provide reduced rates to educational institutions for the purchase of equipment.

Underserved constituencies must be identified and their needs met. As an important starting point, learning and training materials must reflect Canada's linguistic reality. The availability of French-language materials, navigational tools and compatible standards for their distribution is very limited and must be encouraged (Rec. 14.2a).

British Columbia's five-year \$100 million School Technology Plan will increase students' access to technology through:

- equitable access to technology
- a teacher-training program to develop technology skills
- access to ongoing technical support
- the development of local area networking in all public schools
- connections to wide area networks
- the development of links to provincial curriculum priorities.

Training the trainers in existing learning professions and organizations is a must. The current generation of trainers, educators, librarians and school administrators were trained for learning and training in traditional institutions and need to be retrained for the new communications environment. They need to understand and use the technologies, so that they, in turn, can facilitate learning on the Information Highway (Recs. 14.5 and 14.6).

Distance learning must be accredited. Increasingly, learners will want to access course-ware and learning and training materials from distant national and international sources. If learning and training institutions are to benefit from a larger pool of students and customers, they must

make their courses transferable from institution to institution (Rec. 14.7).

Facilitating Change

Targeted research is needed to develop cost-effective applications and effective navigational tools. Because of fiscal restraint, existing centres of expertise, such as universities, colleges, associations, libraries, museums, cultural institutions and technology transfer centres, should remain the primary channels for R&D activities and, moreover, should be linked by high-speed networks (Rec. 11.26).

The focus of such research should be to facilitate the development of and the access to high-quality content material and standards for its development and distribution. The Council encourages greater reliance on partnerships and pre-competitive consortia to disseminate the results of R&D (Rec. 11.24).

Small and medium-sized enterprises drive employment in the Canadian economy. Policies must therefore be adopted to assist the developing technology-based learning and training industry (Rec. 9.15). The government, besides assessing the advisability of delivering its training programs by traditional versus technology-based methods (Rec. 9.16), should implement a competency-based learning and training strategy. Furthermore, it should encourage collaborative projects and invite provinces to share in this approach (Rec. 9.18).

To help Canadians adapt to the employment shifts accompanying the transition to a knowledge-based society, governments should ensure that learning institutions provide Canadians with marketable skills. As a way to link learning, training and employment institutions with economic opportunity, educators and businesses should jointly develop learning modules and certification mechanisms around their areas of practical expertise (Rec. 4.5). The Highway can also be used to improve the efficiency of the labour market by listing jobs as systematically as possible and by facilitating employee searches (Rec. 13.25).

OTHER LEARNING ISSUES

Education Records and Privacy: The electronic registering of individual educational records raises the real possibility that this information, if accessed indiscriminately, could be reused for purposes other than that for which it was assembled, and in ways detrimental to individuals and their livelihoods. The Council recommends that learning and training data be protected from unauthorized collection and use (Rec. 10.7).

Information Controls: As part of democratic expression, learning organizations seek to expose children to materials that reflect diverse values. Even if institutions in Canada sought to control the flow of information to children, they cannot control the learning environment outside school. Information regarded as being offensive is available elsewhere. Nonetheless, technologically based information controls may need to be adopted to protect children from accessing inappropriate materials.

Service providers specializing in learning activities and the learning community must, of course, be made aware that the principles and rules of law apply on and off the Information Highway in Canada. Governments should help develop model codes of ethics reflecting community standards and help provide for community education programs (Rec. 8.4).

Understanding Copyright: Copyright issues are complex and highly debatable, particularly regarding the balance to be struck between the interests of educators and those of creators. The government should advise provinces, territories and faculties of education of their responsibility to ensure that students and educators understand the principles and legislation respecting copyright, and the government should encourage corporate and private training associations to do the same (Rec. 6.12).

A NATIONAL STRATEGY FOR LEARNING AND TRAINING

As societies the world over make the transition to the knowledge-based economy, all stakeholders, from institutions to individual Canadians inside and outside the workplace, must monitor changing skill and knowledge requirements, and begin to make decisions about how best to meet those requirements.

The Council strongly urges governments and stakeholders to develop a comprehensive national strategy for lifelong learning (Rec. 14.2). Enhanced human resources will be the key to Canadian success in the new information economy. This strategy should recognize the need for the respective jurisdictions in Canada to share their expertise and resources and by so doing help improve the quality and mobility of the Canadian work force and the learning community. At the same time it should ensure the development of Canadian learning materials to promote national identity.

Like many of its recommendations with respect to learning and training, the Council's recommendation to develop a national learning strategy needs to be implemented using partnerships. This requires a considerable effort. All major stakeholders **must** be involved: the federal, provincial and territorial governments; learning and training organizations and professionals (K-12 and post-secondary educators, trainers, librarians, counsellors and administrators); industry; labour; non-governmental organizations; parents; technology-based learning and training suppliers and distributors; and communications and information technology firms.

The federal government should focus on:

- policy issues relating to access to Information Highway facilities, equipment and related services
- copyright

- availability and affordability of learning and training products and services via industry and market development, particularly with respect to Canadian content
- development of a comprehensive approach to its internal training programs.

In working with the provinces and territories, the federal government should demonstrate leadership in:

- management of negative impacts, notably issues of privacy and information controls
- R&D policies
- development of international standards for equipment, software, navigational tools and skill sets.

Making a Learning Culture Happen

Education is under provincial and territorial jurisdiction. Accordingly, the Council undertook discussions with the federal government to convey its suggestion that it promptly invite provincial and territorial governments to discuss the Council's recommendations on learning and training.

With respect to its recommendation for the development of a national strategy, the Council from the outset sought to consult with the major stakeholders to make clear that progress could not be made unless the provincial and territorial governments, together with the federal government and other stakeholders, were involved.

The Council believes action should be taken **now**. Success hinges on a collaborative, farsighted effort. The Council proposes that a national conference be organized to bring together stakeholders to launch this process as soon as possible (Rec. 14.2b).

Parallel efforts should be made immediately to link, by electronic means, stakeholders and expertise centres. This would facilitate ongoing discussions and accelerate adoption of the strategy and proposed recommendations (Rec. 14.2b).

Finally, the Council recommends that the federal government enlist key departments to coordinate its response to recommendations in learning and training (Rec. 14.2c).

CONCLUSION

To create a learning culture is to nurture Canadians for the challenges of living with change and ever-intensifying competition. The challenge is immense; the effort required considerable. This shift cannot happen without the combined efforts of Canadians and their governments. The Council's recommendations respecting learning and training, beginning with the call for a national strategy, are intended to set out a vision of life alongside the Highway wherein wealth is created and Canadian culture thrives. To get from here to there will require Canadians to rethink their institutions and themselves – in essence, to grow and learn.

CHAPTER 6

Research and Development, Applications and Market Development

NEW OPPORTUNITIES

Canada faces both opportunity and threat in the evolving global Information Highway. Canadians must now build aggressively on their strengths in the precompetitive and competitive carriage and content industries. Only then will those industries be robust enough to supply the domestic market and develop export capability. If we fail to move with alacrity, our global competitors will move in, taking away potential jobs from Canadians. The choice to seize promptly this opportunity is ours, and what we do now is critical to future generations.

The information technology sector in Canada accounts for 35 percent of all industrial research and development (R&D) in Canada. Of that amount, Canada spends proportionately more on telecommunications than any other member country of the Organisation for Economic Co-operation and Development (OECD). However, according to recent data from the OECD, other G7 countries are increasing their support for R&D efforts in the information technology industries at a rate faster than Canada's.

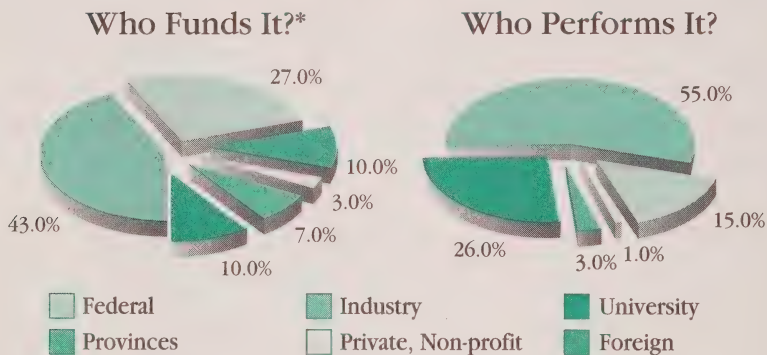
OCRI net, a high-capacity test network, is the world's first metropolitan area research network driven by advanced switching technologies. It serves as a laboratory for developing and demonstrating equipment, techniques and services. Begun in January 1994 and coordinated through the Ottawa-Carleton Research Institute, the test-bed network links 12 nodes through fibre optic cable. Partners in the network include several high-technology companies, educational institutions and government organizations.

The Working Group on Research and Development, Applications and Market Development addressed the issues of R&D, standards and applications related to the Information Highway. It identified the key conditions for success in R&D and areas where Canada can make strategic investments to adapt technology to its specific needs: health, education, electronic libraries and electronic publishing.

MARKET LINKAGE: THE KEY CONDITION FOR SUCCESS

R&D is the wellspring of new and enhanced goods and services. For Canada to realize commercial benefits, including export, its R&D investment choices related to the Information Highway must be driven by strong market linkages. This is particularly true in dynamic and emerging content and carriage areas of the Highway where both the technology and its applications are rapidly changing.

R&D IN CANADA, 1994



* Industry Canada estimate.
Source: Statistics Canada.

As a key condition for success in R&D and applications development, the Council believes that the focus must be on potential commercial success. Linkages to business will ensure aggressive and productive R&D.

Accordingly, the competitive regulatory framework should support industrial and business-based R&D investment decisions (Recs. 11.1 and 11.2). This revised framework should signal a stronger, more market-oriented relationship with industry. That, together with the objective of sustainable competition, will help ensure these investments are sourced in Canada rather than abroad, that

Canadians obtain the high-value-added jobs and that they retain a measure of control over their Information Highway and its products and services.

The Council sets out four ways (Rec. 11.2) in which the government can help stimulate competition and further private sector R&D activity and spending:

- move aggressively toward competitive rates for the provision of bandwidth on the Information Highway
- recognize that certain markets (which may be desirable to serve for social, cultural or geographic reasons) are not commercially viable and therefore should be addressed appropriately
- provide for the sharing of facilities among carriers, based on business arrangements (which are not precluded by regulation)
- as revenues allow for self-sustaining operations, phase out government programs that displace potential commercial opportunities.

WIRELESS TECHNOLOGIES

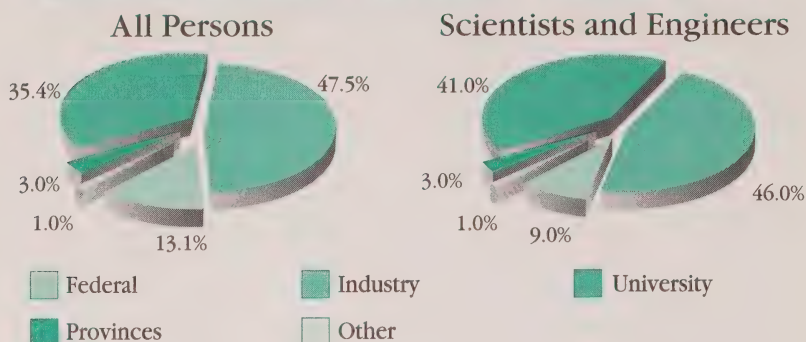
The Council evaluated new and emerging wireless technologies: digital radio, multipoint distribution systems (MDS), personal communications services (PCS), global mobile satellites (GMS), and Direct-To-Home (DTH) satellites.

These technologies will add value to applications (such as mobile services) and improve access by allowing the extension of the Highway to all parts of the country. The Council recommends that Canada move to establish a commercial environment for the interconnection of wireless and wireline technologies (Rec. 11.3). The licensing process for wireless activities and services should be as open as possible.

PARTNERSHIPS

With respect to R&D, the government plays several important roles. It supports R&D by sharing with the private sector the costs of R&D investments. It conducts and maintains R&D capability in its laboratories, supports university research programs and conducts a wide range of science and technology (S&T) activities in support of its programs. Government also plays a role in promoting the development of international standards.

PERSONS ENGAGED IN R&D, BY SECTOR, 1991



Source: Statistics Canada.

R&D TAX CREDITS

Effective Information Highway-related R&D is crucial to Canada's future. The government established Scientific Research and Experimental Development tax credits – commonly referred to as R&D tax credits – in 1944. In reviewing the advisability of various methods of encouraging R&D and applications development specific to the Information Highway, the Council concluded that tax credits are effective, cost-efficient and comprise a proven method for stimulating private sector activity.

The Council believes tax incentives should have a higher priority than grant programs because they are directly commercially driven. Moreover, the administrative structures to deliver tax incentives are already in place (i.e. the tax system), and firms are familiar with procedures, benefits and eligibility criteria (thus, they can reasonably expect to receive benefits when multi-year projects are undertaken). Tax incentives require less administration than grant programs, are easier to access and more efficient and equitable in delivering assistance to both large and small firms. Above all, tax incentives encourage long-term research, and the taxpayer's investment is repaid in economic benefits over the long term.

An important policy objective of Information Highway-related R&D is the encouragement of private investment in applications development to create network volumes that will drive economies of network scale and scope. To that end, the Council recommends that federal R&D tax credits be expanded significantly for Information Highway-related activities (Rec. 11.4). This would be of particular benefit to small and medium-sized technology firms, who are often excellent innovators but lack financial resources.

Collaboration: The Example of CANARIE

Canada has private and public sector firms, organizations and institutions with R&D expertise in information technology. However, many of these firms lack resources for R&D that could lead to competitive products. Resources and expertise must be pooled. In that regard, government can usefully bring parties together and provide modest but strategic funding to get private sector investments rolling.

The Council endorsed the Canadian Network for the Advancement of Research, Industry and Education (CANARIE) as a model of collaboration for building the Information Highway. This successful partnership serves the R&D needs of both public and private sectors. More than 200 firms participated in Phase I (June 1993 to March 1995). The federal contribution of \$26 million levered more than \$125 million in private sector investment aimed at new applications. CA*net was upgraded and the National Test Network was built. The Council endorsed the business plan for Phase II, which has three components: the continuation of the National Test Network; an R&D fund to assist the development of new products and services; and a further upgrade of CA*net.

Other countries have initiatives similar to CANARIE. For example, the United States Government invested more than US\$2 billion in 1994 in a program dedicated to "High Performance Computing and Communications."

Canada must continue to make similar public and private investments if Canadian firms are to compete successfully in the provision of products and services for the Information Highway. The Council recommends that the feasibility of commercializing CANARIE operations be considered after Phase II. To further enhance development activities within CANARIE, the Council recommends that the consortium and the government seek to obtain access to network facilities at minimal cost, and that they earmark savings for further applications development (Rec. 11.5).

Government Laboratories

Better use of, and linkages between, existing R&D facilities and resources in both industry and government, including the federal and provincial governments, would benefit innovation related to the Information Highway.

In government laboratories, research is largely related to statutory or regulatory responsibilities and to international collaboration. The results of such research can be usefully transferred to Canadian research firms. Technology

The National Research Council, the government's principal research agency, has developed imaging technologies that allow users to display and work with 3-D shapes and colours. At the G7 Conference on the Information Society in February 1995, it demonstrated the use of the technology in the digitization of museum collections (such as the display at the Canadian Museum of Civilization), and in 3-D reconstructions of objects and artifacts to be viewed from a remote site. It also demonstrated an industrial application and ways in which the technology reduces the time between the design and manufacturing stages.

transfers would be particularly advantageous because Canadian firms are small relative to their counterparts in other industrialized countries.

Ways to enhance collaboration between private and public sector laboratories include incubator programs in which firms work on-site at government laboratories, demonstration test beds, exchange programs and research parks near these labs. Government could act as an information broker for industry through virtual visits, seminars, newsletters, CD-ROMs and other publications.

Government labs should continue their traditional role of conducting relevant policy research, transferring technology, providing professional development and using the technology to disseminate information.

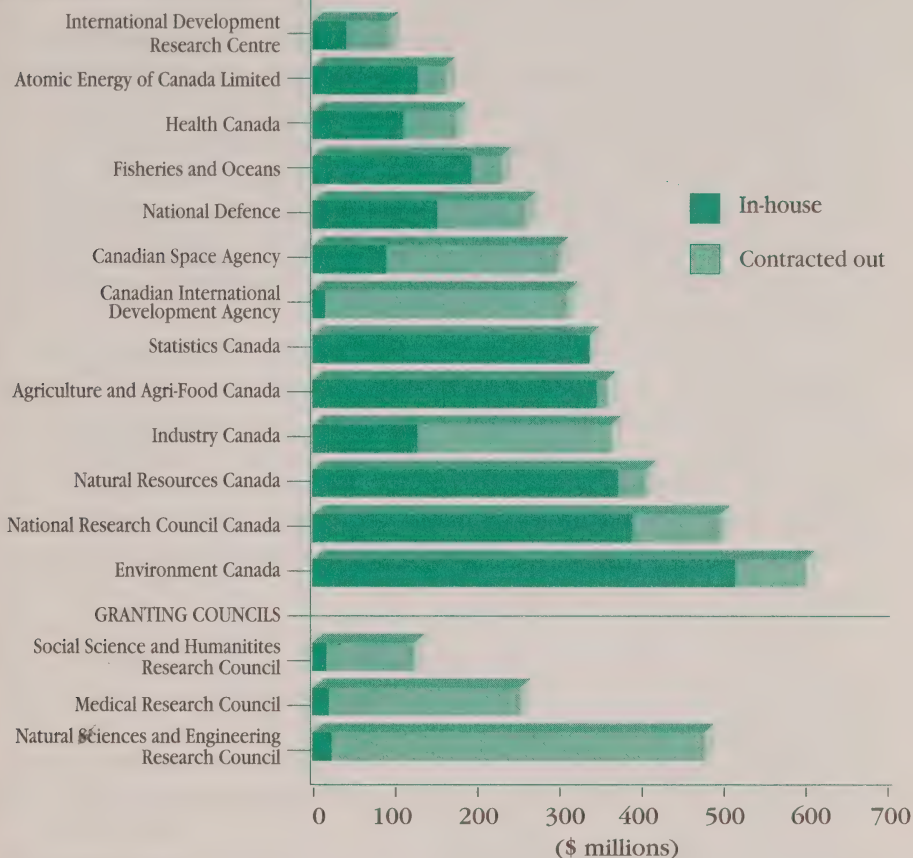
However, to meet the present Highway-related R&D challenges, the labs should take on two new functions: firstly, act as hubs of expertise for labs in their local areas to facilitate the sharing of Canada's S&T resources; and secondly, collaborate with industry labs on specific issues (Recs. 11.10 to 11.12). At the Council's initiative, several CEOs of Canadian research organizations met in September 1995 to discuss the implementation of the Council's recommendations.

Science and Technology Priorities

The federal government spends \$7 billion annually on science and technology (S&T) and is conducting a review of its S&T spending priorities. The Council participated in that review by way of a letter (September 1994) to the Minister responsible and by making recommendations in this report.

FEDERAL S&T EXPENDITURES, 1994-95

S&T DEPARTMENTS AND AGENCIES



Source: Statistics Canada.

Federally supported research is funded under the auspices of different departmental budgets. The Council considers S&T spending as economic policy; thus, its priorities should be determined accordingly. Although the Council believes a single organization should be mandated to devise a central policy-making framework for S&T funding, it sees no necessity in creating a new institution. The cost-effective solution is to make Industry Canada responsible for managing that framework, formulating and implementing policy, allocating funding in support, and establishing objective measures to evaluate S&T spending (Rec. 11.13).

A National Clearing House

The rapid growth of the global Information Highway is dramatically increasing sources of data and information. A national clearing house could provide timely information on infrastructure, and on applications and initiatives related to the Information Highway. Its use would facilitate both private sector and government decision making, and would allow sharing of best practices.

The Council recommends that the government ask the Canada Institute for Scientific and Technical Information (CISTI) to create a clearing house (Rec. 11.14). CISTI could devote a portion of its resources and network-based systems and the efforts of information providers toward collection and distribution of information on Information Highway initiatives and developments in Canada and globally.

Standards

The customers' desire for choice among suppliers of technology, services and content is driving industry toward open or non-proprietary standards. The Council recommends that government and industry promote open standards policies and their rapid development internationally (Rec. 12.5a). By participating in standards development, Canada obtains timely information that helps industry to get products into emerging markets.

It is in Canada's interests to promote open international standards (Rec. 4.1) to ensure that Canadian networks can be connected globally and that Canadians can access information around the world. Involvement in standards is also a requirement for commercial success. Canada must, therefore, remain an active participant in standards development and use its influence to good effect.

There are two types of fora for standards development, one formal and operating by consensus, the other informal and *de facto*:

- fora known as Standards Development Organizations (SDOs), such as the International Telecommunication Union
- *ad hoc* fora such as the Asynchronous Transfer Mode (ATM) Forum and the United States Information Infrastructure Standards Panel (IISP).

Canada should take a balanced approach by participating in both types of fora and encouraging government-industry partnerships. The Council believes that the Telecommunications Standards Advisory Committee of Canada (TSACC) is

doing an effective job of coordinating Canada's participation in the development of international interoperable standards through its work with SDOs (Recs. 4.1 to 4.4).

AN OPPORTUNITY TO DEVELOP EFFECTIVE CANADIAN APPLICATIONS

There is much potential for Canadians to develop applications, information products and services to enhance the way we choose to live. We can either import and adapt "off-the-shelf" technology or we can develop our own applications. For certain applications unique to Canada and our way of life, there is a strong argument to be made for Canada to develop technology specific to its needs. Doing so will enhance our quality of life and stimulate industrial development.

Canada has a window of opportunity to create new applications for its own benefit in health, education, electronic libraries and electronic publishing of scholarly material.

Building a Health Information Infrastructure

Health care, which accounts for 30 percent of provincial government expenditures, is a target for cutbacks in a period of restraint. Every provincial and territorial government has embarked on health reform to improve Canada's health care system and produce, at an affordable cost, better health for all Canadians.

These reforms are driven not only by the need for cost reduction but also by shifts in basic attitudes and perspectives regarding health and health care:

- *from* an illness or disease model *to* a wellness model
- *from* individual *to* population health
- *from* curative interventions *to* health promotion and disease prevention
- *from* acute and episodic care *to* chronic illnesses, rehabilitation and palliation

The Remote Consultative Network provides an electronic health care link between Drumheller, Alberta, and the Faculty of Medicine at the University of Calgary, 100 kilometres away. Telecommunications technologies are used to transmit images and hold consultations between patients and their doctors, allowing for faster diagnoses, access to specialists and better health information without need for costly travel.

- *from institutional care to community, home and self-managed care*
- *from provider-driven to shared decision making.*

The geographic distribution of Canada's population is a major determinant of the quality of health care. About 25 percent of Canadians live in rural communities of fewer than 10 000 people; yet only 20 percent of family physicians and 4 percent of specialists practise in rural communities. Approximately 5 percent of Canadians live more than 25 kilometres away from the nearest hospital and 2 percent live more than 25 kilometres from the nearest physician. The trend toward a smaller number of physicians in Canada is likely to affect physician distribution adversely in rural and remote communities.

At the Ottawa Heart Institute, doctors are using an electronic network as the platform for a sophisticated multimedia consultation network for colleagues working in isolated areas. The Hôtel-Dieu de Montréal and the Centre Hospitalier Universitaire Cochin de Paris are electronically linked, with the capability to patch a variety of medical equipment into the system. Clinicians can see and talk to one another, simultaneously viewing medical imagery and monitoring data.

As basic attitudes toward health care shift, Canadians expect to assume more responsibility for their health and to participate in decisions regarding their own health care. To appreciate the spectrum of choices and to share in decision making, they need easy, timely access to health information and advice.

The Information Highway can bring this information to individuals in their homes and to underserved communities. It can help provide primary care and specialist consultations to currently underserved regions. For example, on-line diagnostic consultations may not only be more timely, but also help reduce distance as a factor in effective health care.

To ensure Canadians deploy these technologies to improve the health of the nation, the Council recommends that the government:

- facilitate the deployment and application of networking technologies in the health sector

- convene a working group of all stakeholders to address the challenges of implementing a health information infrastructure and to identify applications that would benefit all Canadians
- create an investment fund to support demonstrations of networking technology of specific benefit to the health sector and communities at large
- support telecommunications tariff reduction for the health sector to encourage the development of applications and content for the health information infrastructure (Recs. 11.15 to 11.18).

Education

Despite massive investments in education and training in Canada, serious problems remain and need to be resolved. More money must be saved, and learning must be improved in primary, secondary and post-secondary institutions. Illiteracy and innumeracy cost the Canadian economy an estimated \$4 billion per year. Savings of \$26 billion could be achieved if the high school dropout rate falls from its current level of 20–30 percent to 10 percent by the year 2000.

There is a scarcity of computer equipment and computer-related technology in schools. In classrooms to Grade 12, there is an average of one computer for every 15–20 students, and many of those computers are old and incapable of running current software or connecting to the Internet.

Deployment across the country is sporadic. Among educators, there is a low level of computer and network literacy. French-language software and information is scarce, putting Francophone communities at a disadvantage. Aboriginal communities are similarly disadvantaged.

Innovation in information technology and networking can extend access to education. It can improve learning and help institutions control spiralling costs by removing time and distance as a cost factor. The Information Highway can produce economies of scale in the development of content. SchoolNet is an impressive project in this regard.

The Ottawa-Carleton Research Institute, jointly with the Ottawa-Carleton Learning Foundation, SchoolNet, Queen's University and the University of Ottawa, has a training project to help primary and secondary classroom teachers update information technology skills. The pilot project has hired recent faculty of education graduates who possess a high comfort level with telecommunications technology.

Today's students need networking tools and learning resources to function in a new information economy. The Council recommends that the government consider the creation of an industrial strategy to encourage the development of education content and network applications.

Paramount to this strategy is federal support for pricing structures that promote the educational use of telecommunications facilities. In addition, existing centres of research should be networked to share with educators expertise in technology-based education. The development of learning materials in English and French and materials for aboriginal students in their first language should be supported. Software tools must be developed to allow for the display of material in the relevant language. Finally, Statistics Canada should develop more comprehensive statistics to assist in assessing the effectiveness of technology and teaching (Recs. 11.19 to 11.23).

Electronic Libraries

Libraries, galleries and museums contain the nation's cultural and social "memory" and assets. In light of the global nature of the Information Highway, it is all the more important to preserve Canadian content and cultural materials.

Providing affordable electronic access is complex and costly. Digitizing material now in text or image form will require a massive investment. Public and private sector partnerships in pilot projects present a way to start. Giving the private sector the right to add value and to market commercially viable government-owned materials will provide the necessary impetus. These pilot projects should build on Canadian progress in digitization, electronic publishing and document delivery, and should bridge to work done in other countries.

The Council recommends that the material in Canada's libraries and cultural institutions be digitized as soon as possible (Rec. 11.29). New deposits to national libraries should as a rule be in digital form (Rec. 11.32).

Rapid, easy access to relevant information is crucial for the Canadian scientific and technical community, both public and private. For this community, information is the backbone of R&D. The CAN-LINKED Consortium (CISTI, the National Library and 10 Canadian universities) was formed to pilot electronic access to information and documentation in the nation's large research libraries. The Council recommends that the government provide seed money and task the Consortium to collaborate with others to:

- undertake pilot projects that build new tools and enhance Canadian expertise to digitize existing resources
- conduct research on unresolved issues such as copyright, textual and related standards, and the preservation of digitized records (Recs. 11.30 and 11.31).

Electronic Publishing of Scholarly Information

The rapid growth of the Information Highway, especially the Internet, is creating discontinuity and dysfunction in traditional scholarly publishing. In the past, publishers linked scholar and reader and provided for scholarly recognition in the process. Although some academics are disseminating their work electronically, problems remain. Universities have time-honoured mechanisms for scholarly recognition and promotion. They have yet to accommodate electronic communications. Libraries are struggling to provide effective access to existing costly print materials. The handling of large volumes of electronic text presents an additional burden.

With respect to S&T information, distribution in electronic form will speed and thereby cut costs of production and dissemination. However, publishers, for sociocultural reasons – peer review, scholarly recognition, copyright, security, content standards, indexing and archiving, content filtering and retrieval – are reluctant to adopt new technologies. In addition, there are transition factors – parallel print and electronic publishing, distribution and payment – to take into consideration.

The Council recommends that the government provide incentives for the electronic publishing of scholarly information and initiate pilot projects to help resolve the aforementioned issues. The government should also ensure that Canada's large research granting bodies adopt policies to encourage electronic dissemination of research results (Recs. 11.33 to 11.35).

Privacy and Health Information

The confidentiality of health information needs to be protected in view of the increasing capabilities of information technology. Among the most important information requiring protection are health records. Yet, at the same time, the use of personal information, including medical records, for research purposes is of great public benefit.

A balance must be struck between the need to provide strict protection of individual privacy and the need to assist those conducting research to enhance knowledge of public health.

Both objectives can be met through careful development of policies for the collection, preservation and use of health data. The Council recommends that:

- policies to protect the privacy of individuals preserve legitimate research opportunities
- researchers develop a process of public education about the objectives of research projects
- a strategy be developed to create national standards for data access and data protection so that both the confidentiality of personal information and the ability of health researchers to respond to the legitimate research needs of society are preserved (Recs. 10.20 to 10.23).

CONCLUSION

The race is on to build the new infrastructure for the Information Highway. The opportunities to design and build the applications are ours to seize. Using new applications will be key to prosperity in the knowledge economy.

Applications need connections. Public and private sector R&D must also invest in and stay abreast of the development of standards and the technology for interconnection and interoperability. The government should make Information Highway-related R&D a top priority in its overall R&D activities.

Canada must establish business-related conditions to encourage aggressive, commercially driven R&D and applications. It must recognize opportunity in building applications that will serve Canadians at home, and that might also have export capabilities. These are key conditions for Canadians to take full advantage of the power and the promise of the Information Highway.

CHAPTER 7

Implementing Our Vision

Canadians have just begun to consider the impact of travelling the Information Highway and living in a world shaped by new information technologies. It is clear that competition is becoming more intense, that the workplace is changing. Many of us see that jobs are disappearing. At the same time, new kinds of work are emerging. As parents, we worry that if our children do not embrace the new technologies, they will fail. And as they grow up in a global information society, how do we nurture their Canadian identity?

These are understandable concerns. Yet, despite its risks and the uncertainty of its impacts, the Information Highway bespeaks opportunity. Properly harnessed, the new information technologies can be channelled in support of our national goals of economic growth and respect for cultural diversity, social justice and the rule of law. Public sentiment, expressed in recent public opinion polls, suggests that Canadians want to see themselves and Canada reflected on the Highway. At the same time, they want to be “connected” to a global network and economy.

The Highway is a portent of social transformation. Canadians must ask themselves: Are they going to be passive in the face of change or are they going to become agents of change themselves? The Council sees the choice as obvious – information technology must enable Canadians, as individuals and as a society, to use technology for their individual and collective benefit. Our future lies in our hands.

THEMES OF THE COUNCIL'S RECOMMENDATIONS AND REPORT

Throughout its deliberations, the Council kept firmly in mind the government's three policy objectives. It never lost sight of the importance of job creation, the reinforcement of Canadian sovereignty and cultural identity, and the need to ensure universal access at a reasonable cost. With a solid grounding in the operating principles that were enunciated early on in the Council's deliberations, this report and the accompanying recommendations provide a blueprint for the future direction of Canada's Information Highway.

The Council took pains to frame recommendations that were fiscally responsible, practical and pragmatic. They reflect the collective wisdom not only of the Council members but also of other concerned Canadians whose advice and expertise it sought.

These recommendations, which are presented in their entirety in the next chapter, extend across virtually all government departments and jurisdictions within Canada and internationally. Accordingly, the Council believes their implementation requires a sustained, coordinated, coherent effort. The government should, therefore, establish a comprehensive strategy to guide the development of the Information Highway and should undertake public consultation to ensure that specific means and ends are acceptable to Canadians.

To assist the government in articulating this strategy, the Council sets out the major themes of its work as follows:

The first theme is that fair and sustainable competition should be the driving force behind the Information Highway; regulation should ensure an open market, a strong Canadian presence and a fair game.

The investment challenge of the Information Highway and the desire of consumers for more choice can be met only if the move from monopoly toward competition is accelerated. Fair and sustainable competition can best stimulate investment and innovation, and save customers money.

Second – and this theme permeated all aspects of the Council's work – is the need for industry to move quickly in building Canada's connections to the Information Highway. For its part, the government must move to articulate and implement a national strategy for the Information Highway.

If Canada does not move quickly to adapt its regulatory and competitive environment to the new realities of the information economy, Canadians risk being shut out of new business and jobs critical to their economic future.

A third major theme is the necessity of promoting Canadian culture and identity in an ever more global environment and of creating new jobs in the process.

This has always been a challenge because of the small size of the Canadian market. It will be accentuated by the disappearance of borders in a digital environment. Government must be prepared to foster the marketing of Canadian cultural products and nurture Canadian culture and identity in order to increase consumer choice without burdening the taxpayer.

Fourth, if Canadians seize the initiative, the use of the Information Highway will have an “enabling effect,” which should improve competitiveness across the economy and create new opportunities for Canadians in global markets.

In the information technology sector, some Canadian firms have made a dramatic entrance into the global marketplace. The use of the Highway in all aspects of the Canadian economy will enable firms to improve their productivity and cut costs, improve quality and serve the customer at home and around the globe faster and better.

Fifth, innovation is the key to growth in the knowledge-based economy. Research and development is critical to innovation on the Information Highway, which in turn will foster higher productivity and, thus, growth and jobs.

Canadians must reorient their economic contribution toward the demands of an ever more competitive marketplace. While initially there may be job losses and dislocation, jobs will also be created. How? The key is a cycle of innovation, driven by investment in research and development.

Sixth, the Information Highway should be at least as accessible, affordable and relevant to Canadians as telephone and television services are today.

This is what Canadians have a right to expect. Unfortunately, the dynamics of the marketplace may create inequities in access to the Information Highway for certain Canadians – due to geographic isolation; differences in language, physical abilities and gender; or lack of opportunity. Inequities must be addressed by creative collaboration between public and private sector enterprises and, where necessary, government intervention.

Seventh, as both an economic imperative and a means of empowerment, a learning culture must be created within the new knowledge-based society.

Opportunities to learn will be a critical measure of human progress and will determine much of the individual's ability to find and create work. As the information economy evolves, the emphasis must shift from teaching to learning and the workplace must incorporate learning as a continuous feature of working life. All governments in Canada, in collaboration with the private sector, must develop the Highway as a tool to promote a culture of continuous learning.

An eighth theme is the importance of strategic investments to ensure that the Highway and its applications make Canada's health and education sectors examples to the rest of the world.

These two critical components of Canada's social infrastructure are already being reformed to reflect a tighter fiscal environment. Private and public sector investments and applications of new technologies aimed at improving delivery of services are essential to maintaining a high quality of life in Canada.

Ninth, individuals must remain at the forefront of the information revolution. Their interests and rights, especially in matters of security and privacy, must be protected.

The Information Highway will have unforeseeable impacts on social behaviour and moral attitudes. Canadians have a responsibility to articulate the values they wish to see preserved. Privacy is well recognized in Canada as a basic human right and the foundation of a civilized society. It must be defended if necessary by legislation.

Canada's basic challenge as a nation is to recognize this dramatic turning point in history, to make a confident, positive choice to build a more civil society by seizing the new tools of the information revolution and employing them to the advantage of every Canadian.

THE COUNCIL'S MESSAGES TO STAKEHOLDERS

This report was commissioned by the Government of Canada and is therefore addressed first and foremost to the government. But the Council believes its recommendations also speak to other stakeholders in the development of the Information Highway in Canada.

To government, the message is simple. Your roles are as follows:

- Create an environment in which the private sector can innovate, create wealth and create jobs to the benefit of all Canadians.
- Address market imperfections; ensure a prominent place for Canadian content and culture; ensure that Canadians have equitable access to the Highway both as users and as providers of content.
- Set an example as a model user of information and information technologies; use the power of government procurement to help Canadian firms to compete globally.

The temptation for government is to try to do too much – to act where action is not necessarily beneficial; to regulate for short-term protection at longer-term cost; to intervene economically with good intentions but uncertain outcomes. Today fiscal restraint limits spending, but the greater risk is that governments will fail to act boldly in adapting the old regulatory environment to new realities – not just to level the playing field but to clear it of the debris of unnecessary or outdated regulation. The costs of inaction or insufficient action by government are hard to calculate but no less significant than those of direct intervention.

To the private sector, the Council's message is, Get on with it! A global race is on to develop the Information Highway. Canadian firms can take nothing for granted. Competition is influencing almost every dimension of public policy. In the global economy, governments cannot and will not act as they once did to protect firms or sectors against foreign competition. Like the Canadian public, the government will expect the private sector to make the most of a more liberalized economic environment. Public and private sector investments in learning and training are critical to the competitive success of the Canadian work force. Firms that invest in technology and people will prosper; those that do not will fail.

To each of us as individual Canadians, the Council's message is, Get involved as users of information technology. Take charge of our own education. Regard

the Information Highway not as a threat but as an opportunity to enhance our lives and independence.

Think about what kind of society we want to live in. Do what we can to see that vision reflected on the Information Highway. Work for the values we care about. While governments must uphold their responsibility to act where individual rights are at stake, individuals have a duty to look out for their own interests as users and providers of information. The government's job is to ensure that the framework of law and policy respects those rights. To help strike the proper balance, Canadians must engage in open, informed discussion with each other and with their governments.

CONCLUSION

Three hundred and fifty years ago, the fur trade defined Canada's first "national network." Later came the railroad, the telephone, the Canadian Broadcasting Corporation and, more recently, the satellites that link Vancouver to Iqualuit as if the two were next-door neighbours. In their lifetimes, Canadians will witness more technological advances than have occurred in all of recorded history. It is the changes in communication – the telephone, the radio, the television, and now the revolution led by computer technology – that will spark the most impassioned debates about who and what we are as Canadians.

We are in the midst of social transformation. Unlike the changes in the agrarian or industrial revolutions, those in the new age of communications will occur not over decades or centuries, but over days, weeks, months. By the time a product or service is on the market, the next generation has already left the drawing board. Information flow will become not just faster, but instantaneous.

The Information Highway is a means to an end. We want a competitive economy in a society that is civilized and humane. We want opportunity as individuals. We want to maintain our Canadian identity. We also want our sense of community to be preserved in the new knowledge-based society. These objectives will be an enduring feature of life on the Information Highway. Embracing change and crafting it into opportunity is the immediate challenge for all Canadians.

CHAPTER 8

The Council's Recommendations

The Government of Canada made a commitment to develop a Canadian strategy for the Information Highway. The Council's deliberations were guided by three policy objectives:

- creating jobs through innovation and investment in Canada
- reinforcing Canadian sovereignty and cultural identity
- ensuring universal access at a reasonable cost.

and five operating principles:

- an interconnected and interoperable network of networks
- collaborative public and private sector development
- competition in facilities, products and services
- privacy protection and network security
- lifelong learning as a key design element of Canada's Information Highway.

Recognizing that there were questions to be addressed before further progress could be made, the government sought the Council's advice on 15 public policy issues. The Council assigned these issues to its five working groups (some, like the Learning and Training Working Group, made supplementary recommendations on issues before other groups).

Competitiveness and Job Creation Working Group

- 1 How fast should the advanced network infrastructure be built? How will network improvements be financed?
- 2 What is the proper balance between competition and regulation?
- 5 How can the federal government coordinate its activities with other governments?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?

- 15 What opportunities does the Information Highway present to improve government operations?

Canadian Content and Culture Working Group

- 2 What is the proper balance between competition and regulation?
- 3 Should requirements for Canadian ownership and control of communications networks be reviewed?
- 6 How should copyright and intellectual property issues be addressed?
- 7 What measures are needed to support Canadian cultural and other content-based products and services?
- 8 What controls, if any, should be placed on the information that is put on the network?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?
- 13 How can Canadians be assured of universal access to essential services at reasonable cost?

Access and Social Impacts Working Group

- 8 What controls, if any, should be placed on the information that is put on the network?
- 9 How can the Information Highway be used to improve government services to the public?
- 10 How can personal privacy and security of information be protected?
- 13 How can Canadians be assured of universal access to essential services at reasonable cost?
- 14 What consumer awareness and learning opportunities should be provided to enable Canadians to be effective users of the Information Highway?

Learning and Training Working Group

- 14 What consumer awareness and learning opportunities should be provided to enable Canadians to be effective users of the Information Highway?

Research and Development, Applications and Market Development Working Group

- 4 How quickly can Canadian industries move toward universal standards, and how should these standards be determined?
- 11 How can we ensure that Canadian information industries take full advantage of the R&D and technological development opportunities presented by the Information Highway?
- 12 How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?

The Council's more than 300 recommendations are numbered to correspond to the 15 issues. Explanatory notes introduce the recommendations.

ISSUE 1

Timing and Financing

How fast should the advanced network infrastructure be built? How will network improvements be financed?

The cost of upgrading and fully interconnecting existing networks in Canada will be high. Some analysts have estimated the cost of a universal broadband fibre optic network at \$30 billion. Timing and financing issues relate to how fast an infrastructure with capability to provide switched two-way, broadband, multimedia service could be built, and how these network improvements should be financed.

The Council considered who would bear the risk of building the enhanced networks, how fast they should be built, how improvements would be financed, and what the respective roles of government and the private sector would be. A review of Industry Canada's proposed Global Mobile Satellite Policy was also conducted.

Pace of Development

Among the major factors determining the pace of development of the Information Highway are the growth in demand for advanced services, the rate of technological advance, and the capability to finance the new infrastructure. Canada, with one of the world's most highly developed and advanced infrastructures, is extremely well positioned to gain a competitive advantage. The government should establish the right regulatory framework and environment to maximize gains.

Rec. 1.1 The federal government should recognize the urgent need to deal with the regulatory framework and initiate action to remove barriers and implement safeguards, thereby ensuring the right environment for competitive development.

Financing the Infrastructure

Neither the telephone networks nor the cable television networks currently provide a broadband, interactive communication system, but they are examining ways to upgrade their networks. Rapid technological advances are making it increasingly possible for these historically distinct service providers to offer

both new and existing services in competition with each other. With the right regulatory framework and environment, the timing and financing of the infrastructure will be determined by market conditions, and companies will make the necessary investments and bear the financial risks.

- Rec. 1.2 Highway network and new infrastructure should be left to the private sector, and the risks and rewards of the investment should accrue to the shareholders.

Market Demand

To maintain investment in the information infrastructure at a high level, regulatory policy should support investment levels that respond to market demand. It is important that consumers, who are becoming more sophisticated in their use and demand for communications technologies, have access to a wide variety of services in a wide range of quality and prices.

- Rec. 1.3 The provision of the Information Highway facilities across the nation must be driven by existing or potential market demand.

New Technology

In addition to the telephone and cable television networks, the Information Highway will consist of other access technologies, including wireless communications services. Public policy should not favour certain technologies; for example, over-the-air television broadcasting services to cable. The government should pursue technologically neutral policies; i.e., it should not be selecting the technologies to be used for future service delivery of the Information Highway.

- Rec. 1.4 The development of the Information Highway should be “technology neutral.”

Government Role

The Council considered the role of the government in the context of the private sector's role in making the investments in infrastructure and bearing the financial risks. It concluded that the government must, above all, establish the right regulatory framework and environment. National policies should be designed to create jobs and wealth, and stimulate competitiveness and R&D. The government should be a model user and catalyst. Its purpose in participating in standards development is to promote interoperability, stimulate competition, accelerate the deployment of new technologies and protect consumers.

Services will likely be developed and provided in the high-density urban areas of the country before rural and remote areas. Government subsidies or a service fund could be set up to serve underserved areas.

- Rec. 1.5 The role of the government with respect to the timing and financing for the information infrastructure should be limited to supporting R&D, facilitating standards development, serving as a model user, and intervening to achieve its public policy objective of universal access, but only where market forces fail to achieve this; for example, in rural and remote areas and for consumers with special needs (while providing maximum choice of suppliers for services and/or facilities).
- Rec. 1.6 Government policy in this area should be clearly articulated and widely disseminated.

Global Mobile Satellite Policy

Satellite communications will continue to play a key role in providing an increasingly mobile population with access to the Information Highway. Satellites might also prove instrumental in giving more Canadians more timely access.

Government policies place high priority on Canadian ownership and control of telecommunications facilities used for the carriage of Canadian traffic. Specific requirements that respect Canadian ownership and control and that demonstrate clear benefits to Canadians are key elements of the government's new Global Mobile Satellite Policy.

The government policy recommends that Canadian service providers must hold an equity share at least proportional to the estimate of expected Canadian usage of that system. Because of operating areas, the numerous satellites and high costs involved, satellite systems are usually owned by international consortia.

- Rec. 1.7 Recognizing the important role of wireless links in Canada's communications infrastructure, the Council endorses the federal government's new policy framework, which was developed by Industry Canada for Global Mobile Satellite Systems, to position Canadian facilities providers for increased competition and user demands.

ISSUE 2

Competition and Regulation

What is the proper balance between competition and regulation?

Canadian telecommunications and cable television companies developed as natural monopolies due to the high capital cost of the networks and the public policy interest in ensuring universal service. The context has changed. New technologies and regulatory policies have stimulated the growth of competitive service providers, and global deregulation and free trade have increased market demand for a wider range of competitive services and prices. Government policy and regulation have moved away from supporting monopolies toward relying more on market forces.

Traditionally, regulation has ensured that the service providers recover their capital expenditures from the general body of subscribers. However, with the demand from business and industrial users for new and innovative services, an increasingly competitive environment could provide lower rates and less risk-taking among service providers.

Reviews were conducted of the CRTC's report on convergence, and of Industry Canada's proposed Personal Communications Service (PCS) Policy.

The Council considered the barriers that could be removed and the safeguards that could be put in place to enhance competition. The government's ongoing responsibility regarding infrastructure development and the introduction of new services on the Information Highway is to ensure that the legal, policy and regulatory framework for telecommunications and broadcasting continues to evolve toward an increased reliance on market forces. In the current regulatory environment, there are numerous barriers that could adversely impact the pace and scope of development.

Foreign Ownership Rules

Foreign ownership rules are currently inconsistent between broadcasting and telecommunications jurisdictions. In an era of convergence, it creates difficulties for companies developing the Information Highway to access adequate capital,

and results in the inequitable treatment of players. The Council noted the intent of Canadian Heritage to harmonize Canadian ownership requirements prescribed under broadcasting and telecommunications legislation (see also Issue 3).

- Rec. 2.1 Foreign ownership rules under all federal communications legislation should be the same, including the *Telecommunications Act*, *Broadcasting Act*, *Teleglobe Canada Reorganization and Divestiture Act*, etc. At a minimum, the rules should be liberalized to the extent of the *Telecommunications Act*. We also recommend that ownership rules accommodate the evolution of international agreements in these sectors while protecting Canadian interests.

Geographic Gaps in Federal Regulatory Coverage

Current gaps in the geographic coverage of federal regulation result in a non-uniform national regulatory regime, which could inhibit or delay the implementation of new nationwide services.

- Rec. 2.2 The federal government should take all necessary measures to ensure that the geographic gaps in federal regulatory jurisdiction are eliminated as soon as possible.

Municipal Access and Access to Buildings

All service providers should have fair and equal access to multi-tenant buildings and municipal rights-of-way. Where suppliers of Information Highway facilities are denied access to multi-tenant buildings and municipal rights-of-way, the development of competing services and consumer choice would be limited.

- Rec. 2.3 In order to maximize consumer choice, the CRTC should exercise its jurisdiction under the *Broadcasting Act*, *Telecommunications Act* and other legislation to ensure that all Canadian carriers and broadcasting distribution undertakings have access to multi-tenant buildings and municipal rights-of-way on fair and equal terms. If, through legislation or the CRTC, a new class of service providers is created, the present legislation will need to be amended to provide them access as well.

Inconsistent Spectrum Allocations and Assignments

Radio frequency spectrum allocations and assignments need to be consistent in as large a geographic area as possible in order to ensure the orderly development and implementation of new services, and the coordination and sharing of services, particularly with the United States.

- Rec. 2.4 In order to ensure an open, seamless, interconnected Information Highway, the federal government must continue to strive for consistent assignments of spectrum across Canada; allocate spectrum consistent with international radio regulations; and ensure that Canadian spectrum is protected from foreign interference, direction and control.

Access to the United States and International Markets

The lack of access to the United States and international markets needs to be addressed to allow Canadian service providers to develop and take advantage of world market opportunities as soon as competition is viable and sustainable in the domestic market. There are differing views on how this may be achieved.

- Rec. 2.5 Competition in international services should be permitted as soon as such competition is viable and sustainable. The determination of viability and sustainability should be made part of a public proceeding that examines international by-pass issues, use of Canadian facilities, international treaty and trade obligations and foreign ownership caps.

Domestic Market Entry and Lines of Business

Restrictions on market entry into new lines of business must be dealt with in the converging environment of the Information Highway. Freedom of entry and exit; i.e., competition in all services for all firms, must be allowed to achieve the transition from a monopoly to a competitive environment.

- Rec. 2.6 Competition in all areas should be permitted and facilitated whenever such competition is viable and sustainable.

Protection of Ownership of Program Rights

New measures to support a distinct Canadian marketplace for programming need to be developed to offset the economic harm to Canadian broadcasters. This has to be addressed to ensure that Canadian broadcasters do not lose the

economic value of their program rights through the prior exhibition of programs by United States rights holders on Canadian distribution systems.

- Rec. 2.7 Regulatory measures should be developed to fully support programming rights licensed to Canadian individuals and organizations.

Licensing and Regulatory Requirements

Two areas were addressed: the uncertainty associated with the definition of broadcasting; and the multiplicity of legislation and/or regulations governing network facilities and/or services.

The definition of programming services affects investment decisions as entrepreneurs need to know whether a new service would require a broadcasting licence. A multiplicity of governmental regulatory environments increases the complexity of building the Information Highway and the costs of infrastructure and services.

- Rec. 2.8 a. There should be as much certainty as possible regarding which services are or are not subject to broadcasting licensing or exemption requirements.
- b. Municipal, provincial and federal licensing and regulatory requirements should be coordinated with each other, and these requirements should be streamlined and reduced to facilitate the development and dissemination of Information Highway facilities and services.

Safeguards

A number of safeguards need to be put in place as the regulatory environment evolves. Cross-subsidization from monopolies to competitive services should be prevented in order to provide level playing fields in competitive markets. This would ensure that regulated services are not used to unfairly subsidize competitive services. All players should be permitted into all lines of business once barriers are dealt with.

Service providers need safeguards in dealing with integrated carriers to be able to access carrier facilities on the same terms and conditions as the carriers' own competitive operations. Unbundling carrier network facilities will give service providers an option of quicker entry into new markets by using carriers'

network facilities, rather than building their own new facilities, thereby encouraging more competitive services. Some form of number portability, which allows customers to keep their telephone number when changing service providers, may also be a prerequisite to the emergence of local service competition. Common standards for network equipment will be required to promote interoperability and reduce equipment costs.

- Rec. 2.9 Monopoly services should not be permitted to cross-subsidize competitive services. Price cap regulation should be accelerated.
- Rec. 2.10 Cable companies should not be permitted to offer local switched telephone service until telephone companies are permitted to provide licensed cable services, and telephone companies should not be permitted to offer licensed cable services until cable companies are permitted to offer local switched telephone service.
- Rec. 2.11 Essential safeguards should be put in place for service providers.
- Rec. 2.12 Facility unbundling should be implemented by the CRTC where practical.
- Rec. 2.13 Number portability must be addressed in proceedings on local competition.
- Rec. 2.14 Standards bodies should establish open standards for Information Highway network and consumer equipment wherever practical.

The CRTC's Convergence Report

The Council examined the May 19, 1995, report of the CRTC on convergence, titled *Competition and Culture on Canada's Information Highway*. The Council made recommendations in some areas and in others elaborated issues and concerns. With regard to the discussion in the CRTC's report about foreign ownership concerns with respect to holding a broadcast licence, and of structural separation with respect to distribution services, the Council explored viewpoints but made no recommendations.

Regarding interim number portability, the Council recognized that the intent of the report is for parties to provide comparable levels of access for comparable services considering practical issues of technology, availability and cost. In any case, it will be up to the judgment of the CRTC to establish reasonable degrees of access.

Timing

The concerns expressed regarding timing included the following:

- The telephone companies are concerned that the time at which entry may take place is uncertain and that the arrival of competition may be delayed. They are also concerned that the cable companies will be able to offer local switched telephone service while the telephone companies are still engaged in the licensing process.
- The cable companies are concerned that the telephone companies will be able to offer licensed cable services before the implementation of the regulatory measures that enable the cable companies to enter the local switched telephone market. They are also concerned that their entry into local telephony may be delayed by the actions of the telephone companies in delaying interconnection, facilities and number portability. Furthermore they are concerned that without a requirement for reciprocal entry, the time at which their entry may take place is uncertain.
- The cable companies believe that the CRTC should establish periodic reviews to ensure that the assumptions underlying the CRTC report remain valid.
- The telephone companies believe that a predetermined review will simply serve to delay the introduction of competition in accordance with the terms and conditions established by the CRTC.

The Council called for greater certainty on the timing of the transition to competition in the provision of services by local telephone and cable television companies.

- Rec. 2.15 The Council stresses that there is an overriding sense of urgency to move ahead with competition and the development of the Information Highway. The Council therefore recommends that government policy should ensure that:
- a. the rules of entry, to be established by the CRTC, are implemented expeditiously so that the concerns identified above do not arise: the time of entry of telephone companies into the cable market and of cable companies into the local switched telephone market; and a suggested periodic review by the CRTC;

- b. neither cable companies nor telephone companies are given a head start into each other's core business; and
- c. the CRTC arranges the rules so that competition begins as soon as possible, and cable companies are allowed to compete in the local switched telephone market, and telephone companies are allowed to compete in the licensed television market at the same time.

Rec. 2.16 The Council recommends that the government implement a system where the CRTC would begin to consider applications for broadcasting distribution licences submitted by telephone companies concurrent with the CRTC process to resolve issues related to local telephone competition, on the understanding that the telephone companies will not be authorized to operate a broadcasting distribution undertaking until the rules dealing with the regulatory barriers have been established and implemented. Implementation shall be regarded as the availability of the circuits, connections, facilities and services required by the rules established by the CRTC to resolve the following issues – interconnection, interim number portability, rate restructuring, co-location and unbundling – in order to allow for local telephone competition.

Rec. 2.17 The CRTC in its report set a target of 12 to 18 months to establish the rules to remove the regulatory barriers. The Council recommends that the government urge the CRTC to make every effort to meet this target. The Council further recommends that the government urge the CRTC to make every effort to complete licensing and implementation within a further six to eight months. For greater certainty, it is understood that these time frames are targets, and that failure to meet these targets should not result in either the telephone or cable companies getting a head start. The CRTC should not permit these targets to prevent it from dealing with the regulatory barriers in a fashion that permits real competitive entry.

Definition of Broadcasting in the *Broadcasting Act*

The Council agreed that the section of the CRTC's report dealing with the definition of "program" under the *Broadcasting Act* was not sufficiently clear and needed precision.

- Rec. 2.18 The Council believes that much greater clarity is required with respect to how the CRTC currently interprets the definition of "broadcasting" and the criteria it takes into account in making its determinations. The Council therefore recommends that the government request the CRTC to review the definition of broadcasting, answer the following questions and report back to the government in three months:
- a. Does the existing definition encompass all interactive multimedia services, including the educational and medical services identified in the CRTC convergence report as "interactive courses offered by accredited institutions or used by medical institutions, online commercial multimedia services, and educational multimedia materials directed to schools," as well as interactive health services and home banking?
 - b. What are the characteristics of those interactive multimedia services that fall outside of the definition?
 - c. If definitional amendments are required, what is the specific wording that would exclude the services identified in the CRTC convergence report as "interactive courses offered by accredited institutions or used by medical institutions, on-line commercial multimedia services, and educational multimedia materials directed to schools"?
 - d. Would definitional changes restrict the CRTC's ability to promote Canadian content in new services?
 - e. How could the judicious use of exemption orders, including the exemption of classes of services without obligations, obviate the need for changes to the existing definition?

Once this report is received from the CRTC, Canadian Heritage and Industry Canada should, with broad consultation, consider whether the definition of "program" should be amended.

- Rec. 2.19 The Council also considers that it might be useful for all parties to be aware of the criteria the CRTC currently considers in

determining if a service falls within the definition of broadcasting. The Council recommends that the CRTC be asked to indicate whether or not it could publish clear guidelines setting out its interpretations, with illustrative examples, in order to provide greater certainty, and provide such guidelines with its response to the questions set out in Rec. 2.18.

Personal Communications Services

(Note: The Council's recommendations on Personal Communications Services (PCS) went forward to the government prior to its announcement on June 15, 1995, of its policy respecting PCS and its call for applications by September 15, 1995.)

PCS define a wide range of radio-communication services provided through mobile or portable terminals.

Several Canadian companies would like to be licensed to introduce new value-added communications and innovative services. Increased competition in providing wireless services and local loop services will benefit consumers and create opportunities for entrepreneurs and in manufacturing.

In its policy respecting PCS, the government must balance the abilities of large, established companies with proven track records against the need to encourage new providers. To ensure sustainable competition, regulators must strive for equilibrium in the industry structure.

Rec. 2.20 Industry Canada should finalize and release the policy for PCS and simultaneously issue a call for licence applications.

Rec. 2.21 Industry Canada should ensure that the PCS policy provides Canadian business users, application developers and consumers with the greatest possible choice of communications products and services.

Rec. 2.22 The PCS policy should require all system licensees to:

- a. offer third parties non-discriminatory access to their network and services to promote value-added services and content; and

- b. adopt non-proprietary radio technologies and open network architecture that support interconnection and interoperability.

- Rec. 2.23 Industry Canada should issue system licences that are not specific with respect to the technology to be used. Licence applicants should be free to specify the service to be offered in their business plan and be provided future flexibility for new services.
- Rec. 2.24 To promote universal access at affordable cost, Industry Canada should:
- a. favour applicants who propose some form of rapid deployment across their licensed territory;
 - b. favour applicants who encourage value-added services and allow small and medium-sized enterprises to be part of their system;
 - c. require applicants to provide a viable business plan indicating their service rollout, R&D commitments and other promises of performance; and
 - d. put in place safeguards to ensure compliance with business plans.
- Rec. 2.25 Industry Canada should require system licensees to offer a basic level of privacy and/or security to all subscribers.
- Rec. 2.26 The federal government should ensure that PCS licensees be granted the right to interconnect with the telephone companies, cellular telephone networks and other interexchange carriers on a fair, reasonable and reciprocal basis as co-carriers.
- Rec. 2.27 To promote job creation and wealth creation, Industry Canada should favour applicants who commit to R&D expenditures in Canada and who will develop domestic PCS expertise for international trade and investment opportunities.

ISSUE 3

Canadian Ownership and Control

Should requirements for Canadian ownership and control of communications networks be reviewed?

It has been common practice in many countries to limit the foreign ownership of domestic telecommunications carriers and broadcasters. The *United States Communications Act* requires companies using radio systems that provide telecommunications services to the public to have a minimum of 80 percent ownership by Americans. Japan has similar rules applicable to its major domestic and international carriers. Even developing countries anxious to obtain foreign financing for upgrading their telecommunications infrastructure usually insist on control; i.e., 51 percent ownership by domestic interests.

In most countries, the major broadcasters are owned by the government, whereas those countries with private broadcasters usually prohibit or severely limit foreign ownership. Several countries are increasingly discussing relaxing foreign ownership rules and instituting some form of reciprocity arrangements.

The emerging Canadian Information Highway will require large investments, and foreign investors often provide advanced technology and services in addition to capital. Limitations on foreign ownership/participation may have the effect of denying access to needed capital. The objective of retaining national sovereignty over the Information Highway could be realized by liberalizing foreign ownership limits to some degree, while at the same time ensuring that firms, regardless of their origins, operate in a manner consistent with Canada's economic, cultural and social objectives. The Council believes that foreign ownership policies should be reviewed (see Rec. 12.4).

The Council also considered whether or not it would be beneficial to have common Canadian ownership rules for telecommunications, broadcasting and cable television companies. The *Telecommunications Act* requires 80 percent Canadian ownership and control of facilities-based carriers. New regulations provide for investor corporations with at least two-thirds Canadian ownership

to be considered “Canadian,” allowing carriers access to broader pools of capital. By contrast, broadcasting law and regulations impose a strict 80 percent Canadian ownership requirement on broadcasters and cable television networks, with no flexibility for holding corporations.

In an era of convergence between broadcasting and telecommunications, it makes sense to harmonize ownership rules to provide increased access to capital. (The Council also discussed Canadian ownership under Issues 1, 2 and 12.)

- Rec. 3.1 The Council encourages Canadian Heritage to immediately issue a *Canada Gazette* notice requesting public consultation on revisions to the foreign ownership rules for broadcasting in accordance and in harmony with those for telecommunications undertakings.

ISSUE 4

Standards

How quickly can Canadian industries move toward universal standards, and how should these standards be determined?

Different networks, by design, have unique interfaces and standards. Interconnecting them in an equitable manner will require open (as opposed to proprietary) standards to ensure full interoperability. Technologies are being developed to connect networks; to allow users the means to create information in text, graphics, video and sound; to compress information to fit into smaller bandwidth transmission lines; to code, encrypt and store information; and to organize information for access and delivery. Canadian businesses are creating hardware, software and services for both domestic and international networks, and must be involved in the process of setting standards. Canadian standards must be internationally compatible, but achieved not simply through the passive acceptance of standards formulated elsewhere.

Networks and Equipment

The most important feature of standards is that they allow for interconnection and interoperability of networks and equipment. Open standards are particularly important for Canada; as a trading nation, our future prosperity is closely tied to success in the international information economy.

Canada must have early information about standards development and participate in the creation of those most important to Canada. There are two methods of standards development: Standards Development Organizations (SDOs), whose standards are usually accepted internationally, and *ad hoc* fora, which produce standards faster than the first method but whose standards risk not being adopted internationally. The government-industry organization, the Telecommunications Standards Advisory Council of Canada (TSACC), exists to provide national coordination and ensure participation in standards bodies.

- Rec. 4.1 The federal government should endorse open interconnection standards that are supported internationally and by industry. Government-industry partnerships on standards development should be encouraged.

- Rec. 4.2 The Telecommunications Standards Advisory Council of Canada is an appropriate government–industry model to establish commonality of standards. This type of model should be strengthened and broadened to include applicable standards other than network standards (i.e., digitization, content, etc.).
- Rec. 4.3 The federal government should cooperate with industry to support and promote Canada’s active participation in the development of international interoperable standards through work with Standards Development Organizations.
- Rec. 4.4 The federal government and industry should collaborate with other international groups such as the International Organization for Standardization (ISO) and the United States Information Infrastructure Standards Panel.

Learning and Training

International standards for content and delivery mechanisms are essential for developing technology-based learning and training markets and for facilitating exports from the Canadian learning industry.

- Rec. 4.5 To stimulate the development and use of technology-based learning tools, the government should act as a facilitator and encourage key stakeholders such as the provinces and territories; national standards bodies; and associations representing the learning community, industry, business, including small and medium-sized enterprises, and labour to develop:
- a. open standards for hardware and software to ensure interconnection and interoperability with a view to facilitating development and supply as well as users’ selection and purchase of technology-based learning solutions;
 - b. assessment criteria to establish validity and reliability of learning products and services;
 - c. competency-based skill sets (required by firms and industries) that are matched to learning outcomes developed by learning organizations; and
 - d. a means to recognize and allow for the portability of credentials and skills throughout Canada.

ISSUE 5

Government Coordination

How can the federal government coordinate its activities with other governments?

Various levels of government in Canada fund the development of a broad mix of research, education and community networks. In addition, several provinces have identified telecommunications as a key sector for economic growth, and have initiatives under way. Federal, provincial and territorial governments need to work together to stimulate industry investment and innovation, facilitate development and deployment of advanced applications, explore joint service delivery to businesses and the public, and increase public awareness and capacity to exploit new tools.

Canada's Information Highway must be linked to and integrated with the networks of our trading partners to help create a seamless global information infrastructure. This global reach will allow businesses and individuals to access information, markets, clients and partners around the world.

The Canadian Information Highway strategy must address Canada's role within key international fora such as those for the development of international standards, and determine how Canada should proceed in areas such as joint projects between countries, access to offshore technology by Canadian firms, and R&D collaboration with trading partners.

Leadership and Coordination

Though the private sector will be the likely builder and operator of the Information Highway, governments must establish a favourable economic, investment, legislative and regulatory environment that addresses the concerns of all stakeholders. This will require coordination among all levels of government in fiscal and investment decisions related to the infrastructure; mechanisms for federal-provincial dialogue and cooperation; partnerships with the private sector; and consultation with Canadians as Canada moves toward a knowledge-based society.

The Council concluded that the federal government should take the lead in helping the various stakeholders develop the Information Highway as a shared enterprise, and in developing for users a national process of learning. It should establish a high-profile focal point for such a process and formulate an integrated action plan for the government-wide deployment of the Information Highway.

- Rec. 5.1
- a. A federal-provincial-territorial committee should be established, under the leadership of a high-level official of Industry Canada, to coordinate federal Information Highway-related activities with those of other levels of government within Canada. This same official should be responsible for coordinating the federal government's Information Highway activities with those of foreign governments.
 - b. The Information Highway Interdepartmental Committee, now established within the federal government under the leadership of Industry Canada, should be mandated to develop a coordinated, interdepartmental approach to the development of the Information Highway.

Regulatory Reform

Various levels of government have differing regulatory requirements. This multilevel approval process introduces unnecessary complexity, delay and additional costs. The federal government should take the lead in consolidating differing levels of governmental requirements to establish a single list of requirements. Such an approach would facilitate a more cost-effective deployment of network infrastructure and services, and reduce the costs of the approval process.

- Rec. 5.2
- The federal government should initiate a process to determine how municipal, regional, provincial, territorial and federal licensing and regulatory requirements can be coordinated, streamlined and reduced in order to facilitate the development and dissemination of Information Highway facilities and services.

International Coordination

One outcome of the February 1995 meeting of G7 countries on the Conference of the Information Society was the recognition, by public and private sector participants, that governments can play a significant role in the development of a global Information Highway and the advent of a knowledge-based society.

Various international fora address communications and information issues, and trade fora increasingly focus on telecommunications matters. However, there is a need for closer international coordination on issues related to the Information Highway. This calls immediately for a more concerted approach by Canada in the various economic and technical fora. Over time, the creation of a new international body or mechanism may be necessary to focus exclusively on matters related to the Information Highway. Such a body could also serve to advance the process of developing international standards for interoperability and interconnectivity.

- Rec. 5.3 a. The federal government, in close collaboration with industry, R&D organizations and computer network interest groups, should continue its action to coordinate the development of a global Information Highway. Canada, for example, could initiate an international meeting of national Information Highway advisory bodies.
- b. The federal government should strengthen Canada's linkages with international fora such as the G7, the Asia-Pacific Economic Cooperation (APEC) and the Organisation for Economic Co-operation and Development (OECD) and should promote the development and adoption of open standards in international organizations such as the International Telecommunication Union (ITU) and the International Organization for Standardization (ISO).

ISSUE 6

Copyright and Intellectual Property

How should copyright and intellectual property issues be addressed?

Content-based products and services such as books, computer programs, audio-visual programs, sound recordings and databases will increasingly rely on electronic distribution channels to reach markets. The new digital environment poses intellectual property questions. To answer them requires a review of the present copyright framework and international instruments that regulate copyright.

The report of the Council's Copyright Subcommittee, one of the first attempts to comprehensively examine copyright law and practice in the context of the Information Highway in Canada, received considerable support from the Council. It served as the basis for the following recommendations.

Principles

The Council articulated a set of principles to help stakeholders address issues raised by increased digitization. These principles will also prove useful in explaining copyright legislation to the learning community – who are critical players as major users and trainers of creators of works – and other public groups.

Government information stored in a regularly updated and easily accessible electronic catalogue can contribute significantly to making Canadian-content materials more accessible to the learning communities. Licensing practices represent a way government can increase information flows and thus increase access to its information holdings.

The public must understand the basics of copyright in a knowledge economy, be informed of and recognize the importance of copyright laws and principles.

- Rec. 6.1 In the context of accelerated digitization of information, the federal government should adopt principles for copyright based on the following:
- a. maintaining a balance between the rights of creators to benefit from the use of their works and the needs of users

(including the education and learning community) to access and use those works on reasonable terms;

- b. encouraging industry, creators and user communities to develop and implement an administrative and regulatory framework that is easily understood and implemented by all interested parties and not seen as a barrier to access or use of content on the Information Highway;
- c. recognizing creativity as required for the information-based economy and the multiple roles of individuals of the Information Highway (creators, disseminators and users of information);
- d. encouraging the creation of works as critical to national and cultural identity and economic development; and
- e. facilitating the exchange of information.

Categories of Works

Some believe multimedia works are protected under the current *Copyright Act*; others believe their protection requires the creation of a new category of works. Some hold the view that all works created and stored in a digital medium should enjoy *sui generis* protection. The purpose of the following recommendation is to give assurance that such action is neither required nor appropriate. Multimedia works have sufficient protection under the existing category of works titled Compilations. The digitization of works, in itself, generally does not result in the creation of new works but constitutes the expression of copyright subject matter in a different format.

Rec. 6.2 The current categories of works contained in the *Copyright Act* sufficiently identify works produced and used in a digital environment and should not be amended or eliminated.

Use of Works

The intent is to clarify that the right to communicate to the public by telecommunications includes the transmittal of works that are received at different times or at the convenience of the user; i.e., on-demand services.

Currently, infringement of the rental right gives rise only to civil remedies. In the absence of criminal sanctions, the statutory language should be tightened

to clarify that the rental right cannot be circumvented by transactions such as “restocking fees,” which are, in effect, commercial rental activities.

- Rec. 6.3
- a. Communication to the Public by Telecommunication: The Council is of the view that this right embraces the communication of material to the public, regardless of whether or not that material is made available on an on-demand basis. If further consideration establishes that this is not clear, the *Copyright Act* should be amended to state clearly that a communication offered to the public by means of telecommunications is subject to the authorization of the copyright owner, even where such communication is made on-demand to separate individual users.
 - b. Rental Right: The statutory language of the *Copyright Act* should be tightened to impede or prohibit hidden and unauthorized acts of commercial rental in the case of computer programs and sound recordings.
 - c. Copyright Protection in General: Provisions should be introduced for statutory damages based on the United States model.

Browsing

The new technologies present unique challenges for the protection of works. If the Information Highway is to be viable and sustainable, creators must be guaranteed continued protection of their works. At the same time, users must be assured of fair and reasonable access to those works. One such issue that has proven to be particularly complex is “browsing.”

In its report, the Copyright Subcommittee concluded that “the act of browsing a work in a digital environment should be considered an act of reproduction.” In other words, browsing a work could mean either accessing a work, even if it is temporary or ephemeral in nature, or the making of a copy. In some countries, accessing a work in a digital environment is considered a reproduction, even where the work is temporarily stored in the random access memory (RAM) of a computer.

Council members representing users were concerned that a broad interpretation of browsing would limit the ability of users to access works. They believe that browsing a work simply for the purposes of determining whether they

would like to use it could mean users would be unwittingly liable for copyright infringement.

Council members representing creators believed that the ability of users to access works should not be a matter of concern because copyright owners would authorize, in advance, the use of their works before the work is made available.

The Council was cognizant of the need to strike a balance between the interests of creators and users. At the end of the day, there was general agreement that copyright owners must be able to determine whether and when browsing should be permitted on the Information Highway. To assist both users and creators in the new digital environment, the Council recommends that the *Copyright Act* be amended to provide clarification of what constitutes “browsing” and what works are “publicly available.” In formulating the following recommendation, all Council members recognized that further study and consultation with stakeholders will likely be required before this complex issue can be fully resolved.

- Rec. 6.4
- a. It should be left to the copyright owner to determine whether and when browsing should be permitted on the Information Highway; the owners should identify what part of their work is appropriate for browsing.
 - b. The *Copyright Act* should be amended to provide a definition of “browse” along the following lines:

“Browse” means a temporary materialization of a work on a video screen, television monitor or similar device, or the performance of the audio portion of such a work on a speaker or a similar device by a user, but does not include the making of a permanent reproduction of the work in any material form.
 - c. In addition, the *Copyright Act* should provide a definition of “publicly available work.”

Fair Dealing

In the context of copyright, accessing and reproducing works in a digital environment is increasingly complex. It is important that users comprehend better the extent and nature of copyright liability. The Council is aware that the current fair dealing provisions apply in a digital environment. However, it was agreed that the fair dealing provisions should be made more specific in order to provide guidance for users on the Information Highway.

- Rec. 6.5 The section of the *Copyright Act* on fair dealing should be clarified. Specific criteria and guidelines as to the scope of the fair dealing exception should be provided in the *Copyright Act*, including explicit clarification that fair dealing applies to the making of an electronic copy of a work and to the storage and transmission of that copy by electronic means.

Moral Rights

Moral rights include, among other things, the right to paternity and right of integrity of the work. The right of integrity is attached to the honour and reputation of authors who, in order to seek remedy, must show that their reputation has suffered from the modification of their work. The alteration or mutilation of originals of certain artistic works (paintings, sculptures and signed, original lithographs) infringes the author's right of integrity.

The nature of the digital environment allows for the easy modification of works, which, in turn, could lead to the infringement of moral rights without the knowledge of the author.

Some argue that on the Information Highway, certain works should be made widely available, particularly such public information as laws, regulations and statistics. However, given the importance of safeguarding the integrity of such works, users should not be able to modify them. Thus, the public interest lies in both the free availability of such works and in their remaining intact with their sources clearly identified. The issue of access to public information is more appropriately addressed in the context of Crown copyright.

- Rec. 6.6 a. The moral right of integrity should be maintained.
- b. The presumption of prejudice should be brought back to its original intention, namely, where modification is that to an original.

- c. The legal framework governing copyright should ensure, rather than curtail, the development of systems to monitor the uses of copyright on the Information Highway.
- d. The possibility of affording certain works a regime of protection limited only to moral rights should not be considered.

Crown Copyright

In the Council's view, ensuring universal and easy access to public information on the Information Highway does not require the abolition of Crown copyright, but instead requires a more liberal approach to making works of the Crown available to the public.

The federal government should adopt a more flexible policy with respect to Crown copyright and should make a greater effort to make public information available on the Information Highway without requiring payment or prior authorization.

The federal government, where necessary to justify costs, should retain the ability to generate revenues. However, where Crown copyright is asserted for generating revenue, licensing should be based on the principle of nonexclusivity.

- Rec. 6.7
- a. Crown copyright should be maintained.
 - b. The Crown in Right of Canada should, as a rule, place federal government information and data in the public domain.
 - c. Where Crown copyright is asserted for generating revenue, licensing should be based on the principles of nonexclusivity and the recovery of no more than the marginal costs incurred in the reproduction of the information or data.

- Rec. 6.8
- In the area of Crown copyright, the federal government should create and maintain an inventory of Crown works covered by intellectual property that is of potential interest to the learning community and the information production sector at large; negotiate nonexclusive licences for their use on the basis of cost recovery for digitization, processing and distribution; and invite provincial and territorial governments to provide similar services.

Distribution Right/Ownership

The right to communicate to the public by telecommunications currently contained in the *Copyright Act* clearly applies to the electronic transmission of works to the public. There is therefore no need to introduce any new rights, such as an electronic distribution right.

The first-sale doctrine is a United States provision that holds that, under United States copyright law, the distribution right is “exhausted” with its first use or distribution, other than with regard to importation. Since there is no need for an electronic distribution right in Canadian law, there is no need to consider the introduction of the first-sale doctrine.

Rec. 6.9 An electronic distribution right should not be introduced in the *Copyright Act*.

Rec. 6.10 Given that an electronic distribution right is not recommended, the first-sale doctrine should not be introduced as it is merely a necessary adjunct to the right of distribution.

Administration

Upon review of the range of mechanisms that could be developed to track and enforce copyright on the Information Highway, the Council concluded that a combination of technological, policy and legislative solutions was appropriate. The industry itself, with the assistance of the federal government, is best suited to develop technological solutions. With respect to policy initiatives, the industry and government should work in partnership to educate users and creators about the use of copyright in a digital environment. The only legislative action recommended regarding this issue is to amend the *Copyright Act* to make it a criminal offense to tamper or by-pass copyguards or encryption technologies for the purposes of infringing copyright.

The role of government should be to encourage, but not to engage in, the creation and operation of systems to streamline rights clearance for users. The communities of creators and users should determine the best approach to the clearance of rights for users of works on the Information Highway.

Rec. 6.11 Enforcement:

- a. The federal government should assist in the development and standardization of user-acceptable ways to track use of protected works.

- b. The federal government should assist in the development and use of “identifiers” to be included in the distribution of protected works in a digital format to make it easier to trace copyright ownership and unauthorized use of protected materials.
- c. The federal government should take an active role, in partnership with industry and the creator and user communities, in a public education campaign to better inform users and creators about the use of copyright.
- d. The federal government should consider the full range of policy instruments at its disposal to ensure effective copyright protection in order to support the creation of new Canadian works.
- e. Tampering or by-passing, for the purposes of infringement, of any kind of encryption or copyguards, should be made a criminal offense under the *Copyright Act*.

Rec. 6.12 Rights Clearance:

- a. The federal government should encourage the industry and creator and user communities in the creation of administrative systems to streamline the clearance of rights for use of works in a digital medium.
- b. Compulsory licensing should not be considered in the commercial marketplace.

Public Education

Both users and creators and the industry in general need to better inform themselves about the rights of creators and the responsibilities of users on the Information Highway. The federal government can lead by example by exercising copyright in a responsible manner, by participating in copyright enforcement programs and by ensuring that government works are broadly and routinely distributed. Finally, and most importantly, it is essential to the development of Canada’s Information Highway that the government and industry work together on a public education campaign on the use of copyright on the Information Highway.

- Rec. 6.13
- a. Users and creators should assume greater responsibility for informing themselves on copyright and the application of various rights in a digital world.
 - b. The federal government should lead by example as both a model “user” and “creator.”
 - c. The federal government should take an active role, in partnership with industry and the creator and user communities, in a public education campaign to better inform both users and creators about the use of copyright.
- Rec. 6.14
- In any public education campaign undertaken by the government, the learning community should be specifically included to better inform creators and users about copyright and the responsible use of creative works in a digital world.
- Rec. 6.15
- The federal government should advise provinces, territories and faculties of education of their responsibility to ensure that students and future educators have an adequate understanding of copyright principles and legislation. Corporate and private training associations should also be encouraged to provide adequate training in copyright principles and legislation.

Bulletin Board System Operator Liability

The Council recognized that under the current law, service providers could be held liable for copyright infringement. Only common carriers that function solely in that capacity are exempt from copyright liability under the *Copyright Act*. However, it was felt that, with the absence of any recourse to some form of defence mechanism, copyright liability of bulletin board system operators could be too rigidly interpreted.

- Rec. 6.16
- No owner or operator of bulletin board systems should be liable for copyright infringement if:
- a. they did not have actual or constructive knowledge that the material infringed copyright; and
 - b. they acted reasonably to limit potential abuses.

ISSUE 7

Culture and Content

What measures are needed to support Canadian cultural and other content-based products and services?

As the ninth most important industry in Canada in terms of GDP, the arts and cultural sectors are critical to job creation, investment and economic output. Collectively, they generated \$24 billion a year (4 percent of GDP) in 1992 in direct and indirect revenues, a 44 percent increase in current dollars over 1986–1987. Culture is one of the fastest growing sectors in terms of employment; some 700 000 Canadians earn their living directly or indirectly in cultural activities.

Canada has strong cultural industries largely because rules have been there to nurture them. Broadcasting policy plays an integral role; it is through the *Broadcasting Act* that Canadian ownership is maintained and a prominent place for Canadian content is ensured.

The policy objectives in the *Broadcasting Act* include ensuring Canadian ownership and control of the broadcasting system; providing a public service essential to national identity and cultural sovereignty; encouraging the development of Canadian expression; providing the delivery of programming at affordable rates; and contributing to the creation and delivery of a wide variety of Canadian programming. As required by the Act, each element of the broadcasting system has an obligation to contribute to the creation and presentation of Canadian programming.

The Council urges renewed commitment to meeting these policy objectives on the Information Highway. New measures may be required to reinforce Canadian content and cultural policies in the context of the Information Highway.

By any standard, the range of choice of programming in Canada is astonishing. However, policy makers must continue to keep an eye on the degree of penetration of the Canadian market by foreign cultural products. Traditionally, the problem has been addressed through legislative and regulatory measures such as Canadian-content regulations, Canadian-ownership requirements and copyright.

Canada's cultural industries often do not have access to the capital and markets needed to compete with major foreign producers of mass culture. For example, about 96 percent of movie screen time in Canada is occupied by foreign films; 70 percent of what is heard on the radio originates from outside of Canada; and in the distribution of film, video and audio-visual productions, foreign-owned productions accrued almost 60 percent of revenue in Canada in 1991-1992.

Certainly Canadians do not want to see the Canadian Information Highway used to distribute mostly foreign products and services. A fundamental question with respect to the Information Highway is whether the existing rules will be sufficient to reinforce and encourage the success of our cultural industries. How do we ensure that Canadian products and services are competitive and have a prominent place in the new environment of the Highway? Several factors must be considered, including, for example, the fact that Canadian-content providers may have difficulty detaining Canadian distribution and attracting Canadian audiences. In addition, some Canadian-content providers may not be able to afford access to the tools of production or may have difficulty getting access to training and work experience involving expensive production technologies.

Canadian Cultural Policy

Canadian culture is crucial as a mirror to Canadian society; a mirror that cannot be maintained by market forces alone. Canadian broadcasting and cultural policies have created a climate that inspires Canadian talent to want to remain in Canada, while enabling Canadian consumers to benefit from the widest choice of programming of any country in the world. This degree of choice would not have been possible in a purely market-driven competitive environment. Regulatory and legislative policies have played a critically important role. The challenge is to ensure that these policies are flexible enough to accommodate changes in the technology and the market, yet strong enough to reinforce Canada's cultural and social stability in an increasingly unstable global environment.

Given the evolutionary changes brought on by the Information Highway, and given the effectiveness of broadcasting policy in adapting to past changes in technology and content, the Council believes that the framework of the *Broadcasting Act* can still provide optimum support for the continued presence and viability of Canadian content amid an increasingly wide range of cultural products and services (refer also to Rec. 12.3).

- Rec. 7.1 Canadian cultural policy must be reaffirmed and strengthened in relation to the new information infrastructure.
- Rec. 7.2 The government should confirm the important role of the CRTC to ensure the implementation of long-standing cultural policy objectives for the Information Highway.

Canadian Content

The principal policy objective must be to ensure the availability and prominence of Canadian content. In the short term, regulatory instruments must adapt to embrace a more competitive environment; in the longer term, new instruments will be required, such as greater reliance on new content incentives, and navigational tools and menu systems that provide easy and attractive access to Canadian products.

The success of Canadian content will ultimately depend more upon its commercial viability and less upon regulatory obligations. The regulatory regime must achieve greater efficiency, flexibility, transparency and consistency.

A major success story in Canadian broadcasting has been the French-language sector. The French language must be able to flourish on the Information Highway.

- Rec. 7.3 Government policies should stimulate, through incentives:
- a. the creation and production of new content adapted to the Information Highway, with special consideration for the unique needs of the French-language market;
 - b. the creation, production and implementation of navigational and menu systems in both official languages to ensure universal access by all Canadians to all content.

Canadian Book Publishing

The Canadian book publishing industry is an essential industry supplying the Information Highway, its value multiplying with each electronic format or window. Yet, among Canada's cultural industries, Canadian publishers remain uniquely at the mercy of international trade distortions, such as dumping, as well as the disadvantages brought on by continental economies of scale. To ensure that Canadian publishers will be able to contribute to the Information Highway, short-term remedial action and longer-term structural measures, such as those that currently apply to other cultural industries, will be required.

- Rec. 7.4 Given the current precarious state of the Canadian book publishing sector, the government should put in place fiscal measures that support financial viability for this industry until longer-term measures emerge. Structural policies to ensure the industry's long-term viability should include investment incentives, as well as access to funds designated for multimedia programs.

Carriage of Canadian Content

Of paramount importance is two-way access to the Information Highway – the ability not only to receive but also to provide content. In this respect, the role of the *Broadcasting Act* cannot be understated. The Act requires distribution undertakings to “give priority to the carriage of Canadian programming services and, in particular, to the carriage of local Canadian stations.”

As the range of products and services expands on the Information Highway, securing “shelf space” for Canadian content will be essential. Canadian content must also be featured prominently, at eye level. The challenge will be to establish clear rules for all distributors to achieve this objective.

- Rec. 7.5 Government policies should continue to recognize and implement measures that give priority to the services of Canadian programming undertakings and, in particular, ensure the pivotal role of local private and public radio and television broadcasters as key universal providers of Canadian information and programming services to Canadians.

- Rec. 7.6 Formal, enforceable access rules should be developed to strengthen the principle of priority carriage for all licensed Canadian programming services on all distribution systems, ensuring access to capacity, channel placement menus, navigational systems and ancillary capabilities in accordance with their contribution to Canadian broadcasting.

Carriage/Content Separation

The *Broadcasting Act* calls for programming that is varied and comprehensive, expressing a range of differing views on matters of public concern; indeed, the promotion of diversity has been a tradition in Canadian broadcasting policy and regulation. As companies merge to face global competition, maximize competitive advantage and benefit from vertical integration, maintaining

diversity will require structural measures that discourage preferential treatment based on ownership interests.

- Rec. 7.7 The principle of carriage/content separation should be maintained, at a minimum, through the requirement of structural separation between programming and distribution undertakings and with other reasonable safeguards.

Digitization/New Applications

If Canada's rich history and heritage in the archives of the CBC, museums and libraries are to reach new generations of Canadians who are primary users of network services, it is important to digitize Canada's public holdings. Of these, audio-visual products are the most precious; yet, because of their analog format, they are in various states of disintegration (see also Recs. 11.29 to 11.32).

- Rec. 7.8 In order to encourage investment into the digitization of their collections, governments may solicit competitive bids from the private sector for licences to reproduce in digital form, to add value to and to market its holdings in museums, art galleries, libraries and other heritage institutions (excluding those works protected by copyright) to the benefit of all parties and the Canadian public. In negotiating such agreements on licences with the private sector, heritage institutions should make provisions to ensure affordable access to the digitized holdings.

- Rec. 7.9 The government should take steps to encourage the digitization of cultural holdings with a view to promoting and facilitating the use of Canadian content in interactive multimedia applications. A portion of the funds granted to heritage institutions should be earmarked for the digitization of collections according to priorities set by the heritage institutions themselves.

Ensuring a Strong Canadian Presence

Government regulatory and financial support is required to level the playing field and ensure a strong Canadian presence on the Information Highway. Strategies to ensure the development of Canada's cultural industries are a necessity, yet reliance on government support must also be reduced. The objective must be a self-sustaining environment.

That the Council proposes such an approach should not be taken to preclude some form of continued government support. A complete withdrawal of

support could result in a Canadian industry tailored primarily, even exclusively, to a foreign market. Nevertheless, the cultural industries sector can and should move toward greater self-reliance.

Government policies could do more to encourage the production of exportable content. As markets multiply and diversify, Canadian cultural products must stand out and appeal to consumers. They must strive to achieve maximum quality and marketability and not simply take up obligatory shelf space.

Canada's cultural industries are typically comprised of a few small and medium-sized private-sector businesses and public institutions such as the CBC, the National Film Board and provincial educational broadcasters. To compensate for their smaller size, Canadian players must devise strategies to maximize their potential in both domestic and foreign markets.

The Council recognized the importance of the Information Highway and of more traditional distribution and exhibition media to Canadian content. Success in traditional venues, often the products' "first window," will continue to affect Canadian cultural industries' ability to recoup their investments.

Canada will not be the only country moving toward a "500 channel" universe. Others will be confronted with excess-capacity-seeking content and service providers will be searching for content. Canadian cultural industries must be made aware of and exploit these export opportunities as they develop.

Rec. 7.10 Funding should provide incentives to maximize the exposure of a program in different media and markets.

Development and Delivery of Canadian-Content Learning Products

Partnerships that instill a culture of technological innovation in education and the arts must be encouraged. Given the rapid pace of technological development, measures should be devised to encourage multidisciplinary research projects between private, public and academic laboratories on the one hand, and creators on the other hand. These partnerships should be supported in order to stimulate a climate of technological innovation. Centres like the Centre for Information Technology Innovation, McLuhan Centre, Banff Centre for the Arts, Canadian Film Centre, etc., must maintain close ties with Canada's artistic and creative community.

Furthermore, creators themselves must become fully adept at using new technologies either in the production of their works or in order to more efficiently disseminate their products.

- Rec. 7.11 Because of the importance of the learning market, the Council of Ministers of Education, Canada (CMEC) should be encouraged to urge its members to adopt policies (i.e., procurement, incentives, etc.) that will foster the development and delivery of Canadian learning products and services.
- Rec. 7.12 Educational opportunities should be made available for Canadian creators to learn to use new technologies.

Funding the Production of High-Quality Canadian Content

In Canada, public funding has traditionally provided content producers with a substantial portion of the costs of meeting high standards. However, it has become clear that public funding can no longer provide those same levels of support. As public funding wanes, will the marketplace become the sole determinant of “quality” on the Information Highway, or will the longer-term public interest continue to play a role?

The Council examined ways to direct new resources to Canadian content while maximizing the benefits of existing funding sources.

In recent years, non-public funding generated as a result of broadcasting regulations and policies has played an important role in the production of high-quality Canadian content. For example, the CRTC currently requires all cable operators to provide 5 percent of basic service revenues to the production of community programming. Many cable operators also contribute to a fund to assist the production of Canadian content. Council members unanimously agreed that all distribution undertakings, including cable and telephone companies, should contribute to the fostering of new venues for the creation and distribution of Canadian productions.

- Rec. 7.13 All distribution undertakings governed by the *Broadcasting Act* should contribute equally through the direct allocation of a percentage of revenues from the distribution in Canada of broadcast services to the development and production of Canadian programming, including interactive multimedia products.

Access to Financing

To further increase the quality and quantity of Canadian programming available on the Information Highway, all producers should be encouraged to play their part. The Council advocates equitable access to production funds, distribution opportunities and fiscal incentives as a corollary to Rec. 7.13. In order to ensure fairness of access for all producers, measures should be introduced to prevent inequitable advantage to non-arm's-length transactions (i.e., when a broadcaster-affiliated production company produces programming for use by the broadcaster with which it is affiliated).

Rec. 7.14 Government policies should permit, with appropriate safeguards regarding non-arm's-length transactions, equitable access to production funds, distribution opportunities and tax measures for broadcasters and independent producers, including multimedia producers.

Taxation

Fiscal incentives are important to encourage Canadian businesses to invest in new products for the Information Highway. In this regard, a sense of urgency permeated the Council's discussions. The deluge of United States software, video games and multimedia products into the Canadian market will continue to accelerate unless and until Canadian consumers are offered diverse, high-quality Canadian alternatives. Only then will our content providers make effective use of the country's pool of creative talent in areas such as software-imaging and children's programming.

One fiscal measure that has been most effective in assisting the development of a Canadian content industry is Section 19 of the *Income Tax Act*, which disallows the tax deductibility of advertising in foreign media primarily directed to a Canadian market. It has been instrumental in directing advertising revenues into Canadian media. However, Section 19 is not technology-neutral; it applies only to print and broadcasting media. New genres such as electronic publishing and on-line services are not covered.

Although it is widely believed that the interactive aspect of electronic media would render advertising in this environment ineffective – the belief being that consumers could delete any advertising – there are, in fact, on-line services that use a split-screen delivery with the top three quarters of the screen page devoted to content and the bottom quarter to advertising. This, in effect, makes deletion of advertising difficult if not impossible. In light of the

fact that Section 19 already applies to the print and broadcasting media, the Council deems it reasonable to extend it to all electronic media. Council regretably notes that Revenue Canada's enforcement of Section 19 has been lax.

Rec. 7.15 The federal government should put in place funding or tax incentives to encourage the development of Canadian multimedia content products; continue to support Canadian publishers and other cultural industries; and promote export opportunities for Canadian content.

Rec. 7.16 Section 19 of the *Income Tax Act* should be amended to apply to advertising in new media applications such as electronic publishing and on-line services. Moreover, Section 19 of the *Income Tax Act* should be properly and consistently enforced.

Federal/Provincial and International Harmonization

Two obstacles facing content producers are the lack of congruence between federal and provincial government programs, and the difficulties in negotiating international co-production treaties. Thus, it is difficult for Canadian-content producers to take full advantage of existing funding opportunities. Moreover, they face numerous bureaucratic and administrative hurdles in accessing such funds.

Rec. 7.17 In order to facilitate the production and export of Canadian programs, film productions and multimedia and to encourage co-productions between Canadian producers and those from countries with which we have co-production treaties, there should be, as a first step, federal-provincial harmonization of support funds, access rules and objective criteria, or other incentive measures where appropriate.

As a second step, there should also be, where appropriate, such harmonization between Canadian and treaties-countries' funds and other fiscal incentive measures.

Discrete Canadian Market for Program Rights

There are massive disparities between advertising and subscriber bases of networks in the United States and in Canada. In the absence of clearly separate Canadian rights, this would provide an overwhelming competitive advantage to United States services. Considering the predominance of United States

programming on Canadian television screens and the precarious situation that viewer fragmentation creates in a small market such as Canada's, it is critical that the government recognize such threats and pursue a clearly separate domestic track for Canada.

- Rec. 7.18 Government policies should continue to enforce a discrete Canadian marketplace for program rights and to discourage the continentalization of such rights.

Canadian Content in Learning and Training Materials

Canadian content will depend significantly on foreign markets for survival and success. This is particularly true for the new learning and training industries that compete with foreign producers of content for a share of the domestic and global markets. Given the general scarcity of public funds today, governments need to focus their efforts on ways to strengthen the capacity of the Canadian industry to develop new-media learning materials. Funds need to be redeployed from traditional to new media.

- Rec. 7.19 The federal government, through its procurement policies and in considering its international obligations, should provide support to the Canadian "new-media-based" content industry by a) ensuring the purchasing of Canadian new media learning and b) becoming an exemplary user of new Canadian learning and training materials. In addition, the federal government should invite all provinces and territories to adopt similar policies.
- Rec. 7.20 The federal government should encourage financial institutions to facilitate access to capital for new media content producers.
- Rec. 7.21 The federal government should make available, through partnerships with private industry, digitized Canadian content from institutions such as museums, archives and government departments to schools, colleges, universities, libraries and other learning and training organizations.
- Rec. 7.22 Existing applicable federal government programs and policies should be reoriented with a view to the distribution of more of their funding and services to the development of Canadian content learning and training materials intended for delivery on the Information Highway.

Funding for Content Development

On the Council, there was wide support for the concept of directing additional resources to Canadian production, based on the principle that those undertakings benefiting from the ability to distribute the wide array of Information Highway content services should make direct financial contributions to the production of Canadian content.

- Rec. 7.23
- a. Increased emphasis should be placed by the federal government on those parts of the *Broadcasting Act* that refer to educational programming.
 - b. Where the CRTC licenses competitive broadcasting distribution services, conditions of license, while ensuring equitable contributions to the objectives of the *Broadcasting Act* by all distribution undertakings, should allow for alternative ways of making contributions, which include learning and training activities. Such measures will be undertaken in close cooperation with the provinces and territories.

ISSUE 8

Information Controls

What controls, if any, should be placed on the information that is put on the network?

Pornographic, obscene and hate materials have already begun to appear in various computerized and electronic forms, such as electronic bulletin boards and the Internet. In this form, they are easier to obtain but more difficult to monitor and take action against. With the proliferation of new media and the increased capability of a whole new host of information providers to transmit and broadcast information to increasingly larger audiences, the issue arises with regard to controlling certain kinds of information on the Information Highway.

It is crucial to maintain a distinction between content that is illegal (hate propaganda, obscenity, child pornography, harassment, defamation and libel) and content that is offensive. There are many legitimate content and service providers, so it is important to ensure that measures to prevent prohibited communication do not impinge unduly on permissible communication and freedom of expression.

In Canada different levels of government have different responsibilities regarding control of content. Besides the enforcement of the *Criminal Code* and the *Canadian Charter of Rights and Freedoms*, the role of the federal government in matters related to expression is defined by the *Telecommunications Act*, the *Broadcasting Act* and the *Canadian Human Rights Act*. Provincial governments have film and video review boards that enforce local regulations, including the prohibition of certain content and the enforcement of age restrictions. Municipal governments have by-laws concerning the licensing and zoning of "adult entertainment."

In a digital environment, problems of enforcement arise regarding jurisdictional boundaries. Questions of liability of owners, operators and users need to be clarified. Whether different forms of electronic communication are private or for dissemination of information to a broader public is a distinction requiring clarification because of its legal and enforcement implications. The right and ability to control information flowing into the home also demands serious consideration. Some on-line information services provide various control measures for home-based consumers.

The Council believes that the federal government has not only an obligation to inform and educate the public about the rules of the Information Highway, but also a role to play in encouraging R&D into technical solutions for offensive content.

- Rec. 8.1 The federal government should implement a program to educate the public, stakeholders and law enforcement officials on the fact that the principles of law (currently embodied, for example, in the *Canadian Charter of Rights and Freedoms*, the *Canadian Criminal Code* and the *Canadian Human Rights Act*) also apply to computer-mediated communications.
- Rec. 8.2 The federal government should take immediate steps to lead in the development of legislative measures with regard to clarifying the question of liability of owners, operators and users of bulletin boards, Internet and Usenet sites.
- Rec. 8.3 The federal government should encourage broad community support for organizations that combat hate propaganda published on computer networks. (Indications are that such an approach is one of the most cost-effective measures in the struggle against prejudice on-line.)
- Rec. 8.4 In conjunction with the provinces and territories, owners, operators and users of bulletin boards, Internet and Usenet sites and law enforcement officials, the federal government should take immediate steps to facilitate the development of a model code of ethics and practices reflecting community standards and to provide for community education programs.
- Rec. 8.5 In conjunction with the development of a model code of conduct, the federal government should also encourage the participants in the code of ethics exercise to develop guidelines for complaint handling and a resolution mechanism.
- Rec. 8.6 The federal government should establish a technical committee comprised of owners, operators and users of bulletin boards, Internet and Usenet sites to:
- a. identify technical solutions that will ensure that individuals, parents, businesses, community-based organizations or public

institutions (such as schools or libraries) have the ability to select easily the content they want. (For example, passwords help ensure restricted access; user validation and certain payment mechanisms uphold age restrictions; adaptive filters on home personal computers screen out inappropriate violent or sexual content.)

- b. identify technical solutions that will ensure that all material distributed via the Internet from Canadian sources can be attributed to a verifiable person and site. This could include both the requirement to authenticate individuals for whom system access codes are established and the maintenance of logs required to trace information distributed via anonymous posting and redistribution services. Availability of this information must be subject to the expanded privacy guidelines previously recommended.

Rec. 8.7 The federal government should actively pursue bilateral and multilateral arrangements at the international level in order to deal with jurisdictional problems in the control of harmful or illegal communication on global networks.

ISSUE 9

Government Programs and Services

How can the Information Highway be used to improve government services to the public?

Significant savings and improved quality of service may be possible for the government through the use of information and communications technologies. Many believe the greatest potential benefit is if governments take a more active role in financing the development and deployment of applications or services in the areas of their responsibility, such as health, education and training.

In its 1994 document titled *Blueprint for Renewing Government Services Using Information Technology*, Treasury Board identified guidelines for the application of the new communications and information technologies across the full spectrum of government operations, including the electronic delivery of government services. The Council endorses this document as a clear statement of purpose and calls for strong leadership by ministers and officials.

Public Access and Service Improvements

The new communications and information technologies allow the government to redefine current services for a digital environment. Services once requiring a visit to a government office (e.g. employment counselling) can be conducted over the Information Highway. Moreover, the new technologies will both permit and require a significant “re-engineering” inside government departments and agencies, resulting in greater efficiency, lower cost of operations and faster, better services for Canadians.

- Rec. 9.1 The government should accelerate the “single-window concept” with potential users to ensure this approach will provide acceptable levels of access to electronic government services for a majority of Canadians.
- Rec. 9.2 Government policies on pricing, access and affordability for the delivery of electronic services should be reviewed periodically and, if necessary, clarified. This will ensure consistency in intent

and application across government departments and agencies, and serve as an incentive for use.

- Rec. 9.3 The government should create electronic directories of services and information available from all departments and agencies.
- Rec. 9.4 The government should ensure that all Canadians are able to communicate and interact electronically with its departments and agencies.
- Rec. 9.5 The government should promote and use strategic partnerships with communities and client groups and other potential information providers.
- Rec. 9.6 The government should, on a priority basis, update policy and legislation pertaining to privacy, access to information and security to reflect the new environment and to promote more openness while providing at least the same level of privacy protection.
- Rec. 9.7 The government should, in consultation with groups representing persons with disabilities and special needs, review and update periodically its policy guidelines for the provision of information and services in alternative formats to persons with disabilities.
- Rec. 9.8 The government should pursue these goals with its major trading partners.

Government Employees and Service Delivery

Change has to be managed and government staff will have to think creatively about electronic delivery of service opportunities. To be effective, electronic service must emphasize accessible, user-friendly and affordable delivery. The government should resist the tendency to design unnecessarily large, complex and expensive technical solutions. Off-the-shelf, proven technology geared to the needs of the users will generally work best.

- Rec. 9.9 The government should involve its employees and their representatives in consultation with users and also create an ongoing consultation process to ensure continuous improvement of services and information.

- Rec. 9.10 The government, wherever feasible, should build on the existing information infrastructure for the delivery of services and information.

Maximizing Benefits to the Economy

While difficult to quantify, electronic delivery offers the prospect of considerable savings to service recipients and intermediaries, especially when the value of their time is included. Electronic delivery should make services easier to access and may increase demand for services. The increased cost to service these new users might offset savings from electronic delivery. The largest potential financial benefit of electronic delivery could come indirectly through the restructuring and streamlining of major social, health and education programs.

- Rec. 9.11 The government should be a role model in the cost-effective use and promotion of information technology.
- Rec. 9.12 The government should establish firm deadlines but provide a transition period to allow for the adjustment of businesses and individuals to the government's electronic systems.
- Rec. 9.13 In order to ensure cost-effectiveness and the use of the Information Highway to its full potential, the government, in planning the implementation of information technology applications, should consider using the existing infrastructure, assessing new client server technology and using the competitive procurement process.
- Rec. 9.14 The government should establish benchmarks for the delivery of services, including performance/productivity indicators that will demonstrate the long-term benefits and cost-effectiveness of information technology.

Learning and Training

Interactive technology-based learning and training applications are more effective than solely text-based ones. Benefits include increased retention, adaptability to the learning pace and style of learners, and flexibility of time and space for learners. They can also be more cost-effective when produced for a significant number of learners, especially if indirect costs are considered, such as travel costs, time off the job, distribution of standardized training throughout the organization and updating of learning materials.

The government has a key role in encouraging the development, application and use of technology-based learning and training, both in its own operations and in the wider community. Small and medium-sized enterprises, who are the drivers of employment and key players in moving into the information/knowledge economy, must be closely involved.

Rec. 9.15 Policies should be implemented to develop the use of technology-based solutions by:

- a. transforming present training programs into a new media format;
- b. sharing expertise and experience in adopting and using technology-based learning and training solutions; and
- c. facilitating technical standards, including interface with databases and navigation tools for learning networks.

Rec. 9.16 Policies should be adopted to assist in developing a technology-based learning and training industry in Canada, particularly for the benefit of small and medium-sized enterprises, by:

- a. providing market information;
- b. setting aside a growing percentage of expenditures for technology-based training and for procurement from private sector firms;
- c. developing a national learning network based on existing infrastructure and learning centres; and
- d. providing incentives such as loans.

Rec. 9.17 The government should, by 1998, have completed an overall review of its learning and training programs delivered by traditional means and compare them with existing technology-based solutions with respect to their cost-effectiveness.

Rec. 9.18 The government should adopt a comprehensive strategy for lifelong learning delivered on the Information Highway for its operations and services and should create a mechanism by 1997 to ensure coordination of all federal government departments'

and agencies' initiatives regarding use of the Information Highway for learning and training.

- Rec. 9.19 The government should implement a modularized, competency-based learning and training approach in areas within its jurisdiction and encourage collaborative demonstration projects with provinces and territories using this approach.

An Effective Government Strategy

In the information economy, Canadians firms must succeed globally. They are still not sufficiently linked; they would benefit greatly from government leadership in setting standards for databases, navigational tools and interconnectivity.

The government can demonstrate leadership to the public and aggressively pursue the implementation of communications and information technologies using a government-wide systemic approach. Additional commitments are needed for an effective overall federal strategy for delivery of services and information.

- Rec. 9.20 A full-time, dedicated, deputy minister-level official should assume the leadership in identifying technology-related issues requiring government attention – such as privacy, security, training – and develop processes for their effective resolution in consultation with departments and other stakeholders.
- Rec. 9.21 A report to Parliament should be issued annually on the progress by government regarding the deployment and delivery of information and services electronically.

ISSUE 10

Privacy and Security

How can personal privacy and security of information be protected?

Governments, public institutions and businesses gather, store and transmit vast amounts of personal and business-related information electronically. Interconnection of networks will increase the amount of information – such as electronic transactions, credit ratings, financial accounts, educational records, and medical and driving records – that can be assembled into profiles of individuals or companies. These records can cross national borders, be resold or reused, or integrated with other databases without consent or remuneration, for purposes unrelated to those for which the data were originally collected. The ability to access, repackage and resell information can benefit individuals as well as firms and create new employment opportunities. On the other hand, public concern about privacy protection is growing, as are business and government concerns over the security of sensitive information.

Privacy Protection

While most governments have privacy protection legislation pertaining to their own activities, only the Province of Quebec has enacted legislation governing the private sector. The Canadian Standards Association (CSA), in cooperation with business, consumer organizations and some governments, is developing a model voluntary privacy code for use by the private sector by early 1996. In order for consumers and users to benefit from electronic information networks, there is a need for a coherent national standard as to what constitutes effective privacy protection in an electronic environment among business, consumer organizations and governments. The Council believes that such a standard can best be achieved through legislation.

While voluntary standards are useful for engaging business in the protection of personal information, there remains the need for effective, independent oversight and for all parties to have the same rules.

Agreement among business, consumer organizations and governments will lead to the use of fair information practices that are understood and used by all parties equally. This should establish greater confidence in the security of personal and confidential information in an electronic environment, including

international trade in services with nations that have established similar privacy protection regimes.

The Council believes that Canadians using wireless technology should enjoy the same level of protection afforded to users of wired communications. Banning digital scanners would ensure an overall level of security and privacy protection.

- Rec. 10.1 The federal government should act to ensure privacy protection on the Information Highway. This protection shall embody all principles of fair information practices contained in the CSA draft *Model Code for the Protection of Personal Information*. To this end, the federal government should continue to participate in the development and implementation of effective national voluntary standards based on this model code.
- Rec. 10.2 The federal government must take leadership in the implementation of these principles through the following actions:
- a. in cooperation with other levels of government who share responsibility for various sectors of activity on the Information Highway, establish a federal-provincial-territorial working group to implement the privacy principles in all jurisdictions;
 - b. create a level playing field for the protection of personal information on the Information Highway by developing and implementing a flexible legislative framework for both public and private sectors. Legislation would require sectors or organizations to meet the standard of the CSA model code, while allowing the flexibility to determine how they will refine their own codes;
 - c. in cooperation with the CSA Working Group on Privacy and other interested parties, study the development of effective oversight and enforcement mechanisms;
 - d. establish a working group to coordinate the development, demonstration and application of privacy-enhancing technologies for the provision of government services and information; and

- e. update and harmonize appropriate privacy protection policies, legislation and guidelines applicable to its own operations and to the delivery of government services and information.

Rec. 10.3 Industry Canada should:

- a. establish a working group that includes representation from the private sector, provincial, territorial and federal governments and consumer organizations for the purpose of increasing public awareness and understanding of privacy issues and personal privacy rights through the preparation and dissemination of educational materials; and
- b. encourage the CSA to advance its privacy standard in international standards fora.

Rec. 10.4 Provincial and territorial governments should adopt measures to ensure that personal records, including education and training data, are protected from unauthorized collection, storage and use.

Rec. 10.5 The *Criminal Code* and the *Radiocommunication Act* should be amended to extend the same level of privacy protection under the law now enjoyed by users of wireline telephones to users of radio-based telephones, including cellular telephones, by making it illegal to intercept any radio-based telephone communication.

Rec. 10.6 Except as authorized by the Minister responsible, prohibit the manufacture, importation, sale, distribution and modification of digital scanners capable of monitoring radio-based telephone communication.

Rec. 10.7 Government and industry should cooperate to accelerate the development and implementation of affordable encryption services for radio-based communications.

Basic Level of Security

The Council addressed levels of security, encryption policy, security requirements for electronic commerce, standards and a security infrastructure.

The Council supports the federal government's Information Technology Security Committee initiative, which aims to ensure that, as the government increases its use of information technology in its administration and delivery of cost-effective services to Canadians, personal and business information held in electronic form continues to be protected.

Security, including an adequate legal structure, is necessary to assure privacy, and confidentiality for the conduct of financial and other sensitive transactions. Adequate security is required whether these transactions are in storage or in transit over public networks. A public communications infrastructure must foster consumer confidence and economic opportunity and uphold democratic values.

Rec. 10.8 There should be a basic level of security on the Information Highway that provides message integrity and authentication, as well as a reasonable expectation that communications intended to be private and personal information will be protected.

It must be recognized, however, that no security measure or technology can offer absolute protection of information. The Organisation for Economic Co-operation and Development (OECD) Security Guidelines (1992) state that security "should be appropriate to the value and degree of reliance...and to the severity, probability and extent of potential harm...." The market should be relied upon to provide levels of security over and above the basic level of security present on the Information Highway.

Encryption Policy

Companies should be free to develop their own security encryption systems on the Information Highway, but consumers will expect equivalent levels of service and protection. There is a balance to be struck.

Rec. 10.9 It is in the interest of all Information Highway users and providers that an appropriate balance be found between privacy, civil and human rights, law enforcement and national security on the Information Highway. The key escrow policy and standard adopted by the United States Government ("Clipper Chip") should

not be adopted at this time as an appropriate solution to balancing these concerns in Canada.

Extensive study and public consultation should be carried out to determine how to best strike this balance in Canada in a fashion that respects Canadian sovereignty and adheres to the “Democracy Principle” of the OECD Security Guidelines (1992) – i.e., “that security must be compatible with the legitimate use and flow of data and information in a democratic society.”

- Rec. 10.10 Encryption algorithms and standards, and the process used to arrive at these, should be open to public scrutiny. There must be freedom of choice in the use of these algorithms and standards.

Security Requirements for Electronic Commerce

A timely review of the pertinent legislative and regulatory frameworks is essential to resolve the legal status of “digital signatures” in electronic commerce.

The slow penetration of small and medium-sized enterprises in electronic commerce has been due partly to concerns over security. If Canada gains an early lead in broad-based electronic commerce there could be new opportunities for small and medium-sized firms as well as new jobs and growth in the Canadian economy.

- Rec. 10.11 Widespread use of electronic commerce will offer many new opportunities for growth and job creation in Canada. Therefore, the federal, provincial and territorial governments should work together in addressing the principal legal, trade-control and other security-related issues that may be impeding the use of electronic commerce in the government, private sector and international trade. This should include the potential upgrading of federal legislation such as the *Canada Evidence Act* and the *Interpretation Act* to reflect the important role that electronic transactions and digital signatures will play in conducting electronic commerce on the Information Highway, and continued efforts to achieve greater legislative uniformity across Canadian jurisdictions and with our major trading partners.
- Rec. 10.12 The federal government should work in partnership with the provinces, the territories, the private sector and other

stakeholders to develop mutually acceptable security standards and to promote the widest acceptance of these, both within Canada and with our international trading partners so as to facilitate the free flow of information.

Security Infrastructure

Computer security technology can provide solutions to issues such as privacy, access control, authentication, integrity, and non-repudiation. An important part of guaranteeing security on the Information Highway will be the development of a Public Key Infrastructure (PKI). The federal government needs a PKI for government use in order to meet government privacy, confidentiality and electronic commerce needs in rolling out electronic service delivery. The government can play a leadership role by leveraging Canada's private sector strengths in the security field to deploy the PKI, which in turn acts as a catalyst for private sector security service introduction. Rapid development of a PKI is required to ensure Canada's competitive position and to accelerate the development of Canada's Information Highway.

It is likely that broad-based security will be achieved through several PKIs, to be built by different public and private entities. The federal government's PKI will probably be among the first developed in Canada. An unfragmented "electronic market" on the Information Highway, offering maximum consumer choice, will be possible only if PKI interoperability standards issues are fully addressed.

Rec. 10.13 Government, private sector service providers, users, privacy advocates and other Information Highway stakeholders should work together to develop and implement the policies and framework for a security infrastructure to support Canada's Information Highway. By furthering comprehensive privacy, confidentiality and electronic commerce support measures, Canada can gain a competitive edge in the global information technology market.

In order to ensure that this infrastructure is built and managed in a fashion consistent with Canada's commitment to the OECD Security Guidelines (1992), an oversight body of Information Highway stakeholders should be created to address issues such as the selection, function, interoperability, cross-certification, privacy

protection practices, and standards and policy implications of PKI certification authorities.

- Rec. 10.14 The federal government should take a leadership role in developing privacy, integrity and authenticity services on the Information Highway, through the creation of a uniform public key infrastructure to meet federal government needs.
- Rec. 10.15 The Department of Justice and other departments should review and suggest changes to federal legislation and statutes to provide greater certainty to the areas of digital signature and public key infrastructure services.
- Rec. 10.16 The government and the private sector should continue to work together to develop compatible PKI policies to ensure interoperability and uniform privacy protection for users.
- Rec. 10.17 As a major user of public key infrastructure, the federal government should play a leadership role to establish a common independent Canadian certification authority. This will act as a catalyst for the introduction of private sector services requiring security. The Council regards this as a matter of urgency both from the point of view of enhancing Canada's competitiveness and implementing the Information Highway.
- Rec. 10.18 The government and the private sector should continue to work in partnership to ensure PKI cross-certification between major national and international trading partners.
- Rec. 10.19 The government and the private sector should continue to work together to develop and ensure the widest acceptance of national and international security standards.

Privacy and Confidentiality of Health Information

Health records are personal information that should be protected. At the same time, Canadians have greatly benefited from research initiatives using personal health information collected for other purposes, including medical records.

It is extremely important to achieve the proper balance between strict protection of the rights of individuals and of the possibility of conducting research

that will enhance our knowledge of the determinants of health, the factors and conditions related to health services utilization, and the safety and cost-effectiveness of health services.

The Council believes that with sufficient care in developing policies for the collection, preservation and use of such data and information, both objectives of individual privacy and beneficial health research can be met. In doing so, national standards should be adopted for the collection, retention and access of databases and the protection and security of confidential information.

- Rec. 10.20 Building on existing privacy laws, Canada should adopt guidelines ensuring that the identities of research participants are protected and treated with dignity and respect. Guidelines should focus on standardized measures and technology, such as encryption, to preserve confidentiality of records.
- Rec. 10.21 Emerging policies to protect privacy should recognize the public benefits of access to data for health, health policy and social science research, and should preserve legitimate research opportunities.
- Rec. 10.22 Recognizing that obtaining individual consent is not always feasible nor desirable, researchers should develop a process for notifying, involving, educating and assuring the public about the objectives of research projects, thereby making transparent the manner in which public sector health databases are collected, managed, accessed, retained, disposed, linked and analyzed, while maintaining confidentiality.
- Rec. 10.23 A coordinated consultation strategy should be developed with a wide range of stakeholders to work with the Canadian Standards Association and other interested bodies and organizations to create national standards for data access, data protection protocols and operative procedures that protect both the confidentiality of personal information and the ability of health researchers to respond to the legitimate research needs of society.

ISSUE 11

Research and Development

How can we ensure that Canadian information industries take full advantage of the R&D and technological development opportunities presented by the Information Highway?

The process of innovation is long and expensive, stretching from basic and applied research and development (R&D), through the assembly and demonstration of prototypes and market testing, to final production. In Canada, this process is primarily funded by the private sector. The government plays an important role by providing a positive environment, funding strategic R&D and the transfer of technology from government research labs. Many of our competitor nations have launched large-scale programs to support advanced research and stimulate the development of new products and services. The scale and scope of the purchasing power of all levels of government provide a powerful stimulus in both the deployment of advanced networks and the development of new products and services.

Creating the Proper Environment

To create an environment of sustained competition that will encourage aggressive investment in R&D, the federal government must recognize that competition/market demand is the key driver of R&D for the Information Highway.

R&D is stimulated by a developing market. In terms of the Information Highway, firms are poised to make significant investments but will not do so until uncertainties in the business and regulatory environment are clarified. The federal government can assist in stimulating competition and furthering private sector R&D investment by introducing a new framework, the objective of which is to create an environment that encourages the maximum competition.

- Rec. 11.1 In creating an environment for a new information infrastructure, the federal government has to signal that a new framework will be constructed which, at its core, has a stronger, more contemporary economic relationship with industry to ensure that the infrastructure meets Canadian needs and will position Canada to

compete globally. Associated with this economic relationship is the requirement to create an environment of sustained competition that will encourage aggressive investment in R&D.

This need not raise costs to taxpayers – indeed, if coupled with the notion that the use of this capability will reduce government costs with suitable objectives, both advantages could be met. This agrees with proposals for a new regulatory environment described in the Government of Canada paper *Building a More Innovative Economy* (1994).

Rec. 11.2 More specific initiatives would include:

- a. The federal government should move aggressively toward competitive rates for the provision of bandwidth on the Information Highway.
- b. Required or desired public policy objectives, like social, cultural or geographic coverage that is recognized as commercially uneconomic, must be recognized as such and addressed appropriately to make these objectives achievable.
- c. A long-term objective is creating an environment in which the sharing of facilities among carriers is based on business arrangements. These arrangements should be encouraged and not precluded by regulation.
- d. Government programs, where possible, should promote the commercial value and attractiveness of investments. Programs that displace potential commercial use should be phased out over time as revenues allow for self-sustaining operations.

Promoting the Use of Wireless Technologies

Wireless technologies will provide access to the Information Highway in a mobile environment. They provide alternatives to wireline access and have the potential for providing access to unserved and underserved locations in the country. They will also potentially provide remote regions less expensive access than would be possible with wireline facilities.

There are several wireless technologies coming onto the market. Digital radio, Direct-to-Home (DTH) satellite broadcasting, wireless broadband and Mobile Satellite (MSAT) have each been designed with a particular set of applications and services in mind, but each could be used for other applications as well.

Personal Communications Services (PCS) is expected to provide a wider variety of services; although it is generally designed for mobile use, it could provide a range of services with some that can replace fixed-location services. These technologies offer many possibilities – from one-way and two-way, mobile and fixed, to broadband and narrowband services. However, interconnection and interoperability technologies and standards are required to integrate them into the networks of the Information Highway.

Making the rules for the system licensing process as open as possible for the interconnection of wireless and wireline services will encourage entry and improve the feasibility of delivery of these services in terms of the cost and revenue.

Because of the potential to extend Information Highway services to all parts of Canada using these technologies, it is important for the federal government to promote their use by encouraging industry, promoting standards development and establishing an appropriate regulatory environment.

Rec. 11.3 In order to promote affordable and universal access on the Information Highway, the federal government should facilitate the establishment of a commercial environment for the interconnection of wireless and wireline technologies. The system licensing process of wireless facilities and services should be as open as possible. Both narrowband and broadband wireless technologies not only will potentially resolve the problem of providing access to remote communities, metropolitan areas and ocean areas adjacent to Canada, but also will provide value-added to certain applications, i.e., mobile services.

R&D Tax Credits

The increasing costs and risks associated with new product and service development have resulted in most information technology (IT) firms exploring new ways to fund their R&D projects. While the IT industry accounts for 35 percent of all industrial R&D in Canada and has maintained this lead role over the past several years, there are indications that Canada's R&D efforts are failing to keep pace with those of other G7 countries.

There is a variety of ways by which R&D can benefit the technological and applications development of the Information Highway. There are direct benefits to the IT firm itself in terms of increased knowledge leading to reduced costs and new products and services for sale. There are also spinoff technological applications

outside the firm and “spillover” effects outside technological endeavours. For example, a new medical technology can reduce health care costs, improve service delivery and also result in improved health for individuals.

A more favourable tax climate with appropriate R&D incentives can benefit small and medium-sized firms in the industry. An additional tax credit would be a major benefit for firms that are excellent innovators but often lack financial resources in their early years. Such a tax climate would also attract multinational corporations seeking the most favourable investment climate for R&D.

There is a role for the government in assisting firms to bear the costs and risks of R&D. The debate is over the most effective ways to deliver R&D incentives to firms. The government has been providing tax assistance for R&D since 1944. Benefits in using the tax system include efficiency in administration and equitable access to a broad range of firms. Tax incentives encourage long-term research. Firms that are familiar with the benefits and eligibility criteria of a tax system can reasonably expect to receive benefits when multi-year projects are undertaken. While funding programs such as the Industrial Research Assistance Program (IRAP) have had some success, these programs have a fundamental weakness: they require the government to make selective judgments on which projects are worthy of support. Tax-based incentives leave more to the wisdom of the marketplace and are inherently more fair because they are, in principle, open to a much wider range of firms. The key to any tax-based system is to ensure that the activities being supported are genuine R&D activities aimed ultimately at the company’s bottom line.

Rec. 11.4 The Council recommends that the federal R&D tax credits be expanded significantly, irrespective of the size of the firm, for R&D that is directed at Information Highway products, technologies and applications requiring network capabilities and is incremental to current R&D spending.

Canadian Network for the Advancement of Research, Industry and Education

Canada, despite its historic strengths and developments in communications, needs to invest significantly in its information infrastructure if it is to maintain a competitive position. Our competitors are funding ambitious programs – Japan is committed to serve all homes by 2010 with fibre while the United States has six-gigabyte test networks in operation under its two-year, \$2-billion High Performance Computing and Communications Program.

The Canadian Network for the Advancement of Research, Industry and Education (CANARIE) is focused on speeding up the deployment of broadband networks and sharing the high R&D risks and costs associated with the commercialization of leading-edge technologies, products, applications and services. It is aimed at creating opportunities for businesses, researchers and public institutions like health and education, and exploiting the opportunities for growth and job creation that the Information Highway will provide. It will help strengthen the domestic information technology sector and promote a more rapid diffusion of networking technologies across all sectors.

Phase I of CANARIE is a success. Federal funding of \$26 million is expected to lever an estimated \$125 million from industry and other sources. Phase I projects involve about 200 companies and educational and research institutions across Canada.

In the Phase II business plan, new funds of \$80 million over four years are expected to be matched by \$396 million from industry and the provinces. The estimated incremental spinoff sales resulting from CANARIE R&D activity are \$2.3 billion over approximately 25 years. The direct economic benefits of all program elements over the 10-year period 1993–2002 are estimated to be \$1.15 billion. Indirect technological, economic and user benefits, in the context of the possible influence of CANARIE on the Information Highway, are qualitatively assessed at approximately \$4 billion. The incremental employment over that 10-year period, directly attributable to CANARIE, is some 24 000 person-years.

The CANARIE program is an important venue for federal–provincial–territorial collaboration. The provincial governments recognize the importance of deploying high-speed networks and of *de facto* linking regional networks nationally and internationally.

Rec. 11.5 The Council endorses the Phase II business plan put forward by CANARIE, an education and research networking initiative led by the private sector and aimed at facilitating the development of an advanced Canadian communications infrastructure. While supporting the business plan, the Council also recommends that the CANARIE consortium and the federal government explore ways to obtain access to network facilities at minimal cost and apply the ensuing savings to the support of the applications development program within CANARIE. Furthermore, the Council

recommends that the feasibility of commercializing CANARIE operations be considered after Phase II.

Government Laboratories

The federal government maintains laboratories that contribute directly to R&D by the diffusion of knowledge throughout the country and international collaboration relevant to the Information Highway.

Canadian industry requires greater access to these laboratories to increase the transition from R&D through proof-of-concept to the marketplace. Tools that can be used to promote a closer relationship between industry and federal laboratories include incubator programs where small and medium-sized enterprises spend time working on-site in government laboratories; demonstration test beds available for product testing and demonstrations; exchange programs that transfer people and, therefore, knowledge between industry and the federal laboratories; and research parks where industry locates near the laboratories. Government laboratories should also play a role as information brokers for industry. They can use information technologies to disseminate knowledge through virtual visits and seminars, Canada Business Service Centres (which provide a single-window guide through government services), newsletters, distribution of CD-ROMs and other publications.

- Rec. 11.6 Government labs should support government functions by:
- conducting relevant research in support of public policy, including investigating alternatives for policy action and their expected outcomes;
 - supporting small and medium-sized enterprises through the timely transfer of technology; and
 - playing a role as the government's scientific arm in the application of information technology and telecommunications to the needs of the government.
- Rec. 11.7 Government information technology and communications labs should play an important role in ensuring appropriate professional development of scientists, engineers and science-entrepreneurs to support the Information Highway.
- Rec. 11.8 Government information technology and communications labs should be encouraged to make use of information technologies to

disseminate knowledge beyond their local community, thus increasing their influence in creating a science culture in Canada.

- Rec. 11.9 A directory of all Canadian S&T assets should be established and made available electronically throughout the country to enable industry to select expertise, strategic information, resources and S&T facilities necessary to support their businesses. This can be part of the national “clearing house” of information recommended last February by the Council. (It was recommended that the Canada Institute for Scientific and Technical Information collect and distribute key information related to Information Highway initiatives and developments in Canada and other countries.)
- Rec. 11.10 Government labs should act as hubs for a network of information and communications technologies laboratories to ensure synergy through the sharing of resources and facilities.
- Rec. 11.11 Industry Canada, through the Communications Research Centre, should convene appropriate meetings with the CEOs of the communications and information technology research institutions in Canada to investigate areas and models for collaboration among themselves, industry and universities.

Optimizing the Use of Facilities

Canadian R&D activities in communications and information technology are concentrated in a few organizations that contribute critical knowledge for the implementation of the Canadian Information Highway. Industry Canada, through the Communications Research Centre, can play a role in encouraging collaboration among these organizations in order to leverage investment, increase Canada’s knowledge base and assist the commercialization of new technologies.

- Rec. 11.12 The federal government’s information technology and communications laboratories should adopt a new management regime to fully support Information Highway R&D activities by optimizing the use of their facilities and providing industrial access to expertise and S&T capability, thus enhancing synergy between the private and public sectors.

Science and Technology Review

The Council's comments to the federal government's Science and Technology Review expressed, in part, the view that federal S&T policy making lacks a central framework. Funding for the majority of federally supported research is in different departmental budgets. This vertical orientation makes implementation of a national policy difficult.

The Council believes that S&T policy should be viewed as a critical element of the government's broader economic policy. While it is important to have a central body for federal policy making with regard to S&T funding, it is not necessary to create a new institution to provide a central framework. Industry Canada could be tasked with the roles of formulating and implementing S&T policy, in close consultation with other federal and non-governmental bodies that engage in research. Industry Canada should also be responsible for allocating funding in support of S&T policy and for establishing objective measures for evaluating, in a strict, continuous manner, S&T spending by both clients and stakeholders. It may be necessary to change the mandate of the department to cover these functions, but this would be more cost-effective than establishing a whole new institution.

Rec. 11.13 An organization within the federal government should be charged with the responsibility of formulating and implementing S&T policy, allocating funding in support of S&T policy and establishing objective measures for evaluating, in a strict, continuous manner, S&T spending by both clients and stakeholders.

There is no clear need for the establishment of a new body to meet the objectives as detailed, and therefore it is recommended that these functions be transferred under the mandate of Industry Canada as described in the *Department of Industry Act*.

Gathering Key Information about the Information Highway

There is a need for a national service, or "clearing house," to provide timely, accurate information on the development of infrastructure, applications, programs and initiatives for the Information Highway. This network-based system would provide access to information via a single interface while also operating in a distributed fashion and allowing a user to point to various sources of information and databases.

This national service would allow tracking of the latest developments related to the Information Highway, facilitate decision making and give direction to the work of private firms. It would enable Canadian companies to identify and learn from each other's best practices and demonstrations, thus fostering joint learning, and it would stimulate information technology firms to develop new products and applications for the Information Highway.

This national clearing house of information would constitute the basis for the Canadian portion of the Global Inventory, a G7 pilot project to create and provide an Internet-based multimedia inventory of information regarding major national and international projects, studies and other data relevant to the promotion and further development of knowledge and understanding of the global information society. Canada must keep abreast of the networking infrastructure and applications developments in other G7 countries with a view to interconnecting national networks and creating R&D alliances.

Industry Canada can play a lead role in working with other federal and provincial organizations to gather and analyze key information and ensure that this national clearing house feeds into the Global Inventory project.

Rec. 11.14 The federal government should request the Canadian Institute for Scientific and Technical Information (CISTI) to target a portion of its resources, network-based system and skilled information providers for the collection and distribution of key information related to Information Highway initiatives and developments, both in Canada and in other countries. This "clearing house" would provide industry and other interested groups, through a single interface, access to information relevant to Information Highway technologies and applications. The intent is to make this service part of the G7 Global Inventory.

Building Canada's Health Information Infrastructure

The health care system, one of Canada's greatest national assets, contributes not only to the health and well-being of individuals but also to a productive work force. Universal accessibility of health care means that all Canadians can participate in the economy and contribute to the creation of national wealth.

Health care, which accounts for at least a third of each provincial budget, totals \$70 billion annually across the country, or 10 percent of gross domestic product. In every province, the health care system is undergoing major reform and

budgeting reductions. The health care system is being reconfigured in many ways, through regionalization and integration across sectors, from acute care to long-term care, from institutional to home care and self-managed care. The paradigm is shifting from medical care to health; from curative programs to health promotion, disease prevention and rehabilitation. Consumers are expected to assume greater responsibility for their own health and to exercise greater authority and involvement in decisions about their own health care at a time when the numbers, mix and roles of health care providers are changing.

The federal government has an important leadership role to play in developing a unifying infrastructure that will support national health interests in Canada. A health information infrastructure can play a major role, not only facilitating but also promoting and leading change and, most importantly, minimizing the potential negative effects of the reform process. Technology that ensures equal access to essential health services in a timely fashion for all Canadians can support and enhance our health care system.

A national health information infrastructure will:

- allow on-line diagnostic consultations in a timely fashion, improve the quality of care and reduce costs
- provide care closer to home, preventing costs incurred by unnecessary transportation
- provide essential health services to currently underserved populations
- provide on-line information to empower consumers to make informed decisions about personal health and health interventions
- promote the development of a national, standardized, longitudinal health information database accessible to researchers and policy makers.

Rec. 11.15 The Council supports an initiative to facilitate the deployment and application of networking technologies in the health sector in Canada with the aim of improving health and health care for Canadians in a cost-effective manner.

Rec. 11.16 An Advisory Council of all stakeholders should be convened, specifically addressing the challenges of implementing a health information infrastructure and identify applications that would benefit all Canadians as well as improve effectiveness and

achieve economies. The model of the SchoolNet Advisory Board might be relevant. As with SchoolNet, cooperation with CANARIE would prove valuable.

- Rec. 11.17 An investment fund should be created to support trials and demonstrations of networking technology aimed at benefiting the health sector and communities at large until such time as the savings generated can sustain future development. Funds will permit user groups and communities to explore and develop cost-effective, standards-based systems that can be applied nationally to the benefit of all communities and regions. Pilot projects should be part of an overall implementation strategy. (Trials, demonstrations and pilot projects are not, in general, the focus of CANARIE's funding programs.)
- Rec. 11.18 As part of the strategy to encourage the development of applications and content for the health information infrastructure, telecommunications tariff reduction in the health sector should be supported.

Education Applications and the Information Highway

Canada spends about \$55 billion annually on public education. Including moneys spent by business, governments and individuals on learning and training, learning and training may be the largest sector of the Canadian economy. Education in Canada is under pressure from among other factors, declining budgets, public demands for better results and rapid advances in technology and applications. Canada can do better with its investment in education.

More than incremental changes is needed in order to dramatically improve the educational system. The Information Highway is a primary educational tool that can reduce costs, yet at the same time improve the educational services available to Canadians. For example, the Information Highway can deliver information to students in remote areas of the country at low cost. It can also provide an exciting learning tool to inspire more students to pursue higher education and to improve their basic literacy and numeracy skills.

Before such advances can be made, there is a need to put in place a national strategy to plan and oversee these advances in education. Such a strategy would reflect both the constitutional responsibilities of the provinces for education and the legislative role of the federal government in fostering the development of policies and technologies related to learning and training.

Support for the development of new technologies and educational content is of primary importance in this strategy and in the rebuilding of our education system. There is currently a dearth of good technology-based learning software and systems available in Canada. The problem is magnified when one looks for French-language content or materials available in aboriginal languages. There is also a need for tariff structures to promote the educational use of telecommunications facilities and to mobilize current research and studies to promote the best practices in technology learning and training.

- Rec. 11.19 The federal government, in concert with provincial government industrial development authorities, should promote, through mechanisms such as regulatory policies and negotiations with provincial ministries of education, the creation of an industrial strategy to encourage the development of content and network applications in support of education. This reflects a growing partnership between government and service providers.
- Rec. 11.20 Existing centres of research and expertise in technology-based education should be networked and expanded to act as a resource to educators to conduct studies in the use of technology and the impact on learning, and to determine and help deploy the best practices.
- Rec. 11.21 The federal government should support the development of learning materials in both French and English, as well as the development of language-specific software tools to allow the display of the materials in both official languages. Learning materials for aboriginal students should be available in their first languages, along with appropriate language-specific software.
- Rec. 11.22 In order to assist in the measurement of the effectiveness of technology and teaching, Statistics Canada should gather and disseminate more comprehensive statistics related to technology in education. Such statistics are currently unavailable nationally on a regular basis.
- Rec. 11.23 The federal government should support tariff structures that promote the educational use of telecommunications facilities. This is consistent with the evolution of telecommunications services pricing.

Learning and Training R&D Priorities

The Council recommends research to respond to the overall need for easy access by users of the Information Highway to high-quality learning and training materials and to new approaches to learning and training. Sharing the results of this research and the resources of existing centres of excellence will help maximize the effects and minimize the costs of developing new learning and training access tools.

- Rec. 11.24 Pre-competitive and industrial R&D should focus on facilitating the efficient development of high-quality content material and on the effective distribution of this material to users for integration into larger learning and training environments. Access to this material should be facilitated by the development of intelligent interfaces and navigation agents as well as by the acceptance of technological standards for its development and distribution.
- Rec. 11.25 R&D initiatives should include the development of new approaches for academic, workplace and industrial learning and training environments based upon the use of the Information Highway and of competency-based educational standards to facilitate portability of learning and training programs.
- Rec. 11.26 Existing “centres of expertise” such as technology transfer centres, universities, colleges and associations, as well as libraries, museums and other cultural institutions, should be the primary channels to conduct, promote and disseminate R&D, and they should be supported and enriched by initiatives such as linking them with high-speed networks.
- Rec. 11.27 Academic, workplace and industrial programs should be fostered to “train the trainers” in the use of new technology.
- Rec. 11.28 A process of continuous adjustment to learning and training R&D priorities should be implemented through monitoring, evaluation and dissemination boards or entities such as the virtual national learning network described in the proposed Learning and Training national strategy (see also Issue 14).

Electronic Libraries/Cultural Assets Information Services

Our heritage assets must be available in ways that are conducive to optimal access and use. Providing affordable electronic access is a complex and costly process and requires cooperation. Pilot projects with public and private sector partnerships are an obvious starting point. A strong incentive to the private sector would be the right to add value and to market government-owned materials with commercial potential. Pilot projects should build upon the progress in digitization, electronic publishing and document delivery already achieved by Canadian organizations and should take cognizance of work in other countries.

Formed for the express purpose of piloting electronic access to information and documentation in the nation's large research libraries, the CAN-LINKED Consortium – comprised of members from the CISTI, the National Library and 10 Canadian universities – should be tasked with collaborating with other groups to carry out pilot projects to digitize and distribute existing resources.

New deposits to national libraries should normally be in digital form, so that new material can be easily added to the digital stores and distributed on-line.

Rec. 11.29 Industry Canada, Canadian Heritage, Human Resources Development Canada and the Secretary of State (Science, Research and Development) should facilitate through funding reallocation and strategic/shared-risk partnerships, development of electronic access to the information, documentation, heritage materials, etc., in this nation's libraries and other cultural and information-handling agencies, including government departments.

The recommendation includes:

- a. a two-stage development plan comprised of:
 - i. short term (one to three years) – digitization of print documents, media, etc.
 - ii. long term (three to seven years) – more general electronic production, publication and distribution
- b. CISTI, the National Library and other federal cultural and information agencies should work in strategic partnership with relevant public sector institutions (i.e. university research libraries) and with information and

telecommunications industry representatives to carry out pilot projects as test beds for developing new tools and Canadian expertise.

- c. The private sector should be offered the opportunity to digitize, add value, and market government-owned materials, documents, etc., for which there is a perceived profit.
- d. Access and management software should be developed, including information-filtering systems and pathfinders.
- e. Supportive research is required in copyright, textual and related standards and in the preservation of digitized records.
- f. Interinstitutional partnerships should be encouraged with public and school libraries, regional cultural offices, etc., to accelerate affordable universal access to electronic information.
- g. Incentives should be provided to higher education for preparing information professionals to create and manage the access software, content and services required for the Information Highway.

Rec. 11.30 As part of its S&T strategy, the federal government should task a group of representatives from publishing (academic and commercial), the government, university presidents and/or academic vice presidents, the CAN-LINKED Consortium and the appropriate R&D, information and telecommunications industry representatives to carry out a pilot project or series of projects incorporating and testing various aspects of the previous recommendation.

Specifically, the pilot project should include:

- a. components for the short term (digitization) and the long term (larger issues of electronic publication and distribution);
- b. new access and management software, i.e., filtering systems, pathfinders; and
- c. research in copyright, standards and preservation of digitized records.

- Rec. 11.31 The federal government should provide seed money for the above task. Such seed money need not be new; it should take the form of resource reallocation for research infrastructure funding to Canadian universities in conjunction with proposed changes to transfer payments for education. In addition, incentives to the private sector partners should include the opportunity to digitize, add value and market government-owned materials for which there is a perceived profit.
- Rec. 11.32 The *National Library of Canada Act* and the *National Archives of Canada Act* should be amended to require that all depositors of text-based publications and government records normally make their deposits available in digital format.

Electronic Publishing of Scholarly Material

Distribution of S&T information in electronic form should speed both its production and dissemination, thereby maximizing Canada's large investment in S&T. Publishers have traditionally formed the link between the scholars and the readers and have provided for scholarly recognition in the process. Some academics are now using new electronic means to disseminate their work, but problems remain. Publishers are reluctant to adopt new technologies; universities have time-honoured mechanisms for scholarly recognition and promotion that do not yet include electronic communications; and libraries are struggling to provide effective access to large volumes of electronic text as well as print materials, for which prices are rising.

The Canadian academic community should take appropriate steps to resolve the issues of peer review, scholarly recognition, copyright, security, content standards, indexing and archiving, content filtering and retrieval as well as transition factors – parallel print and electronic publishing, distribution and payment. Pilot studies are required to find means of resolving these issues.

- Rec. 11.33 As part of the federal government's strategy to maximize its large investment in S&T information, the government should provide strong incentives to Canada's universities, research institutions and agencies to recognize and facilitate direct electronic dissemination of and access to research results and scholarly productions.

- Rec. 11.34 To implement the above, the federal government should task a group of representatives from publishing (academic and commercial), government, university presidents and/or academic vice presidents, the CAN-LINKED Consortium and the relevant R&D areas and technologies, with a pilot project to accelerate the shift in primacy from print to electronic publishing by Canadian researchers, scholars and other members of the academic community. The pilot project should incorporate and provide a test bed to resolve the following issues:
- a. adequate peer review, validation and scholarly recognition of research papers;
 - b. willingness of authors to forgo copyright privileges (already a common occurrence for academic authors whose papers are accepted for publication in print);
 - c. effective presentation, indexing, preservation, distribution, etc., for access and archival purposes; and
 - d. use of security technologies to ensure authentication and verification of documents.

- Rec. 11.35 In addition, the federal government should ensure that Canada's large research granting bodies – i.e., the Natural Sciences and Engineering Research Council of Canada, the Social Sciences and Humanities Research Council of Canada and the Medical Research Council of Canada, each of which dispenses millions of dollars annually to Canadian researchers – adopt effective policies and procedures to recognize and encourage the electronic dissemination of research results.

ISSUE 12

Growth and Competitiveness

How can the Information Highway best be used to improve the growth and competitiveness of all Canadian businesses, especially small and medium-sized enterprises, throughout Canada?

The Canadian information and communications infrastructure will have a profound impact on how Canadian businesses organize and operate. This infrastructure underpins the evolution of industrialized countries toward the knowledge-based society. The private sector is and will continue to be the driving force behind Information Highway development and use. A market-based approach to facilitating this will have the greatest impact on growth, competitiveness and employment.

The Council directed its recommendations toward improving the productivity and competitiveness of Canadian business; fostering a competitive marketplace to benefit all consumers; stimulating employment opportunities; evaluating the impact of economic growth, including industrial and regional development; and determining an appropriate role for the government. These themes pervade the following recommendations, which emphasize changes to foster a dynamic and progressive business environment. Any changes must respect Canada's core economic, social and cultural objectives.

Fostering a Dynamic and Progressive Environment

The primary role of the government, with respect to the issue of competitiveness, is to foster dynamic and progressive policies, and a regulatory and legislative framework within which firms and entrepreneurs can flourish and expand employment.

- Rec. 12.1 All levels of government should examine legislation, regulations and policies in order to eliminate unnecessary barriers and promote the use and development of the Information Highway by individuals and firms. Areas of priority attention are teleworking and home-based businesses, consumer protection and the encouragement of financing.

Setting the Example

Establishing a progressive environment is a necessary but not sufficient condition to ensure the evolution of the Information Highway in Canada. There must be a dynamic balance between supply and demand. The Council supports increased government use of the Information Highway and the stimulation of applications and content development by the private sector.

- Rec. 12.2 The government should use the Information Highway to deliver services boldly and innovatively to Canadians. It must disseminate its own information as aggressively and as widely as possible to those who can develop new applications and content.

Choice in Content

The development of new applications and content promises to be a major source of economic growth and increased employment. The environment is changing, and the balancing of economic, social and cultural goals requires innovative approaches that will stimulate the production of content in Canada (refer also to Issue 7).

- Rec. 12.3 The government should develop new approaches for the promotion of Canadian content in a manner consistent with Canada's cultural objectives, the realities of a competitive global marketplace and the tremendous economic opportunities of the Information Highway, and in a way that encourages emerging existing content providers.

Emphasizing Competition

The liberalization of the telecommunications environment may be the most important step to realizing the economy-wide benefits of Information Highway use and development. Following a transitional period toward market-based pricing, a framework of open and sustainable competition for the Information Highway should lead to lower prices, higher quality and a greater variety of services. Canadian firms using the Information Highway should benefit from reduced costs, better customer service, improved links to suppliers and more effective organizational structures that encourage empowerment, creativity and continuous innovation. The Highway also serves to attract global companies to locate value-added activities in Canada.

- Rec. 12.4 Market demand must be the focus of evolving Information Highway competition. To this end, a reformed regulatory system should:

- a. encourage the rapid entry of new suppliers;
- b. reflect convergence and promote synergy by integrating, where possible, information industry regulations;
- c. review foreign ownership policies in order to promote investment and competition in Canada; and
- d. after open and sustainable competition takes hold – which we recognize may take some time to achieve – move rapidly toward general marketplace rules. Limited regulation will still be required in areas such as network interconnection, access to “bottleneck” facilities, elimination of cross-subsidies and number portability.

Open Standards

Open international standards facilitate access to different networks and sources of information, establish a level playing field for the diffusion of new products and services and extend productivity benefits on a global scale. Where international, regional or national standards do not exist, proprietary standards should be permitted on an interim basis, provided they are not used as barriers to competition (refer also to Issue 4).

Rec. 12.5 Government and industry must:

- a. promote open-standards policies and their rapid development on an international basis, while not limiting the scope for early developers and adopters of new Information Highway technologies to enter the marketplace;
- b. ensure a well-functioning market on the Information Highway by maintaining a strong national voice in global standards-setting initiatives;
- c. ensure transparency by distributing standards information; and
- d. support interfaces that are elegantly simple to use.

Measuring the New Economy

A communications strategy led by the Minister of Industry to promote the economic potential of the Information Highway would help Canadians recognize and exploit the opportunities of the knowledge-based economy. Such a strategy must be based on a solid quantitative and analytical foundation, which requires the development of new tools for measuring the knowledge-based economy.

- Rec. 12.6 To better understand structural change, employment shifts and the enabling effect (productivity-enhancing capacity of the Information Highway), government, industry and international organizations should continue to research the economic impacts of the Information Highway in order to provide a solid empirical and analytical basis for concerted action.

ISSUE 13

Universal Access

How can Canadians be assured of universal access to essential services at reasonable cost?

Public policy has long sought to ensure that all Canadians, regardless of their income or place of residence, along with schools, universities, hospitals and research institutions, have access to basic telephone services. Universal access has traditionally been supported by cross-subsidies from long distance to local services. In a competitive environment, prices move toward the cost of providing services, and there will be increased pressure to reduce or eliminate cross-subsidies. As new and enhanced services are introduced, the widest possible customer base will be increasingly necessary for the viability of electronic delivery of commercial and essential public services.

The Information Highway will play a critical role in employment, economic and social well-being, and the exercise of democratic values and citizenship. Without appropriate public policies, there is a risk of creating classes of information “haves” and “have-nots.” In making recommendations to accelerate the development of the Information Highway, the Council had to balance the public policy objectives of universal access and affordability.

National Strategy and Policy Principles

All geographic areas of Canada should have access to advanced digital telecommunications networks that are interoperable from one part of the country to another and among various telecommunications companies. Many services could be delivered over the existing public telephone network, and many more could be delivered using integrated digital technologies; i.e., Integrated Services Digital Network (ISDN). The eventual widespread deployment of high-capacity bidirectional transmission networks, in conjunction with cable television and other video services, will support the delivery of advanced services.

Rec. 13.1 Under the leadership of Industry Canada and in conjunction with other government departments, the federal government should develop a national universal access strategy.

- Rec. 13.2 The federal government should adopt the following principles as criteria for determining how access to facilities and services should be provided on the Information Highway to all Canadians:
- a. universal, affordable and equitable access: local availability of basic access facilities for the delivery of Information Highway services at reasonable cost, regardless of geographical location; equitable opportunity for all, including people with disabilities and groups with special needs, to access and use the Information Highway.
 - b. consumer choice and diversity of information: to the maximum extent possible, provision of services will be driven by market forces. Consumer choice among a wide range of commercial and non-commercial information and services in a variety of formats should be available.
 - c. competency and citizens' participation: Canadians should be able to acquire a basic understanding and command of information technology to enable them to use and benefit from Information Highway services. The Information Highway must provide adequate opportunity for self-expression and participation in the information society and for controlling incoming and outgoing information.
 - d. open and interactive networks: full interactivity, interconnection and interoperability of networks; freedom to provide, circulate and exchange information.

Universality and Affordability in a Competitive Environment

A system of cross-subsidies, based upon value of service pricing and system-wide rate averaging, has been traditionally used to subsidize the cost of basic telephone service across the country. This system is becoming increasingly difficult to sustain in a competitive environment and therefore may no longer be considered a viable means of supporting universal access.

In a competitive environment, prices should be market-based, and services should pay for themselves. However, in certain instances, market failure produces high prices, inadequate service or a lack of choices. This is the case in high-cost-serving areas such as rural and remote locations. If universal rate-based cross-subsidies in the telecommunications sector are replaced with more

explicit subsidies targeted to specific groups with particular needs, the funding of these subsidies is a matter for the government and the CRTC to assess through a public proceeding. Any new industry-funded subsidy should be explicit, fair and reasonable and be competitively neutral, regardless of the distribution mechanism used.

Changing technology, user needs and expectations have caused basic telephone service to evolve substantially over the past 50 years. Market surveys provide few clues as to basic services in the future. Only those services that become essential to everyday life for a majority of the population could be candidates for universal service policies. The uncertainty points to the need for an effective public mechanism and sound criteria to carefully review and, if necessary, modify basic service requirements.

- Rec. 13.3 Public policy should rely primarily upon competitive market forces to ensure the universal access to Information Highway services and products at affordable prices. Government intervention should occur only where market forces demonstrably fail to safeguard this policy objective.
- Rec. 13.4 Where non-market mechanisms are required to achieve universal access to Information Highway services at affordable prices, the federal government or the CRTC should, through a public consultation process, ensure that such mechanisms are explicit, transparent and competitively neutral. Such mechanisms could, for example, include a Universal Service Access Fund, targeted subsidies, cross-subsidies or preferential tariffs.
- Rec. 13.5 The CRTC should conduct periodically a public review process for:
- a. developing or updating, as the case may be, a set of criteria for defining universal services;
 - b. designating services, i.e., the Internet, that should be provided on a universal basis; and
 - c. determining the conditions under which these services should be provided at just and reasonable rates.

Access to Networks and Facilities

Universal access should imply that, regardless of the point of access, anyone should be able to reach anyone else and access the services of suppliers. Other networks that become a part of the Information Highway should be fully interoperable and interconnected.

The major telephone companies have announced investments over the next 10 years to upgrade local access network facilities and make broadband capabilities available to about 80–90 percent of businesses and homes by 2005. According to the companies, 10–20 percent of customers not served by this particular program will be provided access to broadband capabilities through a variety of other access technologies. Customers who want these broadband services will pay an additional basic fee, but it is not clear how these services will be available at reasonable and affordable cost in remote and rural areas.

Canadian policy makers and regulators have paid special attention to the remote and rural areas of Canada. Innovative technologies such as the Anik satellites, infrastructure development programs such as the Northern Native Broadcast Access Program, carrier obligations and other approaches have been used to reduce the difficulties of network access in these areas. New wireless technologies such as Personal Communications Services, cellular, Direct-to-Home and mobile satellites promise to close the gaps further. However, both the cost of services and their availability continue to be a challenge.

Public access points to the Information Highway should become as commonplace as public telephones, postal service outlets and automated banking machines. Universal access is also a function of the availability of non-commercial and community-based networks and public interest services. Special assistance measures will be required for some time if all segments of Canadian society are to benefit from their availability. The public funding that supports shared networks such as CommunityNets, SchoolNets and LibraryNets and common-user access centres will be an important feature for some time to come.

- Rec. 13.6 All public networks that provide interactive services should be interconnected so as to enable subscribers on any network to access and to communicate with any other subscriber of the same service on any other network.
- Rec. 13.7 As a minimum level of access to the public telecommunications network, individual line “touch-tone” service and digital switching

service should be available universally at reasonable rates. Conversion to the above level of access and service should be completed before the year 2000.

- Rec. 13.8 When approving the future investment programs of federally regulated carriers and cable distribution undertakings to upgrade their facilities and services, the CRTC should ensure, through a public process, that the benefits of such programs also accrue to rural and remote communities.
- Rec. 13.9 The CRTC should establish a tariff policy for affordable access to networks and essential services on the Information Highway, taking into consideration the unique circumstances and needs of rural and remote areas, persons with disabilities, and public services such as education, libraries and health care.
- Rec.13.10 To improve access as well as the economic and social development opportunities afforded by the Information Highway for remote and rural communities, particularly aboriginal communities, Industry Canada should adopt a policy of actively supporting as appropriate, the application and cost of wireless and satellite technology solutions in these and other communities, through programs such as CANARIE, the Aboriginal Business Canada program and the SchoolNet Community Access Program. It should further consider requiring licensed radiocommunication carriers to conduct R&D for this purpose.
- Rec.13.11 The federal government, working with other stakeholders wherever applicable, should develop a variety of financial support mechanisms such as tax measures and seed-funding programs to ensure the long-term viability of community networks and to establish and maintain a network of public access points in all communities to enable Canadians lacking other means of access to connect to the Information Highway. For example, the scope of programs such as the SchoolNet Community Access Program should be extended to meet this objective, and Canada Post service outlets could be equipped for use as public access centres.

- Rec.13.12 The federal government should, in cooperation with public libraries, develop and support pilot projects to demonstrate the role of public libraries as public access points to the Information Highway.

Access to Services and Content

Content-based information services have not yet evolved to the point where they are thought of as either universal or essential. Nevertheless, the rapid increase in the use of on-line databases and governments' use of electronically assisted service delivery indicate that these services may be used to a greater degree. For example, in a knowledge-based economy where lifelong learning and continual upgrading of skills become essential, access to electronically delivered learning and training services may be seen by many as essential. Now is the time to consider a public process to identify criteria for designating universal or essential content-based services.

It would be counterproductive to introduce universal-access policies to network and content-based services if large sections of the population are unable to use these services. This problem may become more acute if access procedures and software vary significantly from network to network and from service to service. Special care should be taken in developing uniform and easy-to-use access methods that reflect Canada's unique linguistic and cultural makeup. It is important that every opportunity be used to sensitize service providers and terminal equipment manufacturers to this issue.

- Rec. 13.13 The federal government in consultation with provincial and territorial governments, in developing criteria for deciding which content-based services should be made available universally, should consider the importance of their contribution to: Canadian culture and identity; public safety, health care, administration of justice and government services; and lifelong learning and training.
- Rec. 13.14 Public policy should strongly support the development of uniform, easy-to-use methods of accessing advanced telecommunications and content-based services:
- a. in both official languages and with multilingual capability; and
 - b. wherever possible, with built-in access capabilities for people with disabilities.

Access for Persons with Special Needs

Seed funding is needed for research in new techniques adapting Information Highway products and services for persons with disabilities or special needs. The market is too small for companies to fully fund these developments. Government assistance lends credibility to their development and allows small businesses to get additional funding from traditional sources. A new strategy is needed to replace the National Strategy for the Integration of Persons with Disabilities, which comes to an end in March 1996, and which has provided seed money. The Committee on Communications for Persons with Disabilities believes that ongoing policy advice to the Minister of Industry will be required even after the that National Strategy ends.

Rather than paying for time connected, charging by flat rate or by volume of data transferred is a much fairer charging measure and would not discriminate between users of traditional and adapted interfaces.

A number of equipment manufacturers provide reduced rates for equipment for educational institutions. Such rates are seen as an investment rather than an expenditure.

The Council also reviewed the March 1995 report titled *The Information Highway and Canadian Education* by The Canadian Educational Network Coalition, the SchoolNet National Advisory Board and the Stentor Alliance.

- Rec. 13.15 All services and applications on the Information Highway should be developed keeping in mind the needs and interests of Canadians with disabilities. The Communications Research Centre and the National Research Council research budgets should include funding for this purpose, or funding should be allocated to the National Strategy for the Integration of Persons with Disabilities through a follow-up program.
- Rec. 13.16 Utilities and service providers should offer billing services on a flat-rate basis, actual traffic volumes or some other means rather than connect-time, thus providing equity for those requiring special access technologies.
- Rec. 13.17 The federal government, through the use of its procurement power, should encourage private sector-driven services to be made accessible to persons with disabilities.

- Rec. 13.18 A ministerial advisory committee (the Committee on Communications for Persons with Disabilities) should be continued to provide advice on communications issues for people with disabilities.
- Rec. 13.19 As supported in *The Information Highway and Canadian Education* report dated March 1995, the federal government should ensure, with respect to telecommunications services, that educational institutions are given preferential status from a regulatory perspective.
- Rec. 13.20 Governments, professional associations, unions, school boards and learning and training institutions should:
- a. sponsor or participate in technology-based pilot projects to facilitate the transition toward a renewed learning and training system in terms of service delivery, administration, budgeting, staffing and outsourcing; and
 - b. review periodically the cost-effectiveness of new media-based learning and training content materials and services.

Gender and Social Issues

Gender and social barriers need to be removed if Canadians are to participate fully in the opportunities available through communications and information technology.

Women's issues and concerns related to information technology must be addressed. Some of these, such as safety, privacy and security, could be largely addressed by early implementation of related recommendations in Issue 10 (privacy and security).

Women have to be able to use the Information Highway and contribute to the content carried. The government can raise the awareness of content and hardware providers and can also implement public awareness campaigns targeted to women.

- Rec. 13.21 Industry Canada, Human Resources Development Canada, Statistics Canada and other government departments should conduct and/or support the research necessary to identify how gender, age and other social factors create differences in participation in the Information Highway.

Rec. 13.22 Where differences in opportunity are identified, the federal government with other stakeholders should develop an appropriate response to deal with these differences.

Employment and the Workplace

Job creation through investment and innovation is key to the success of the Information Highway. The Council proposes the creation of an advisory body, in recognition of the need for a clearly identifiable information and policy advisory mechanism to address social policy and employment issues not specifically dealt with by other advisory bodies.

The Council proposes a number of joint industry, labour and government initiatives, for example, to maximize job opportunities and minimize the negative impacts on employment of Information Highway-related technology through human resource development programs.

Rec. 13.23 The Council recognized that there is a need to improve our understanding of the economic, social and employment impacts of information technology, foster an ongoing dialogue between the government, industry, labour and other stakeholders on these issues, and develop effective and innovative policies and mechanisms to facilitate adjustment to the new environment. The federal government, in partnership with industry, labour, universities and other institutions, should form a clearly identifiable advisory body, using existing resources where possible to:

- a. promote and support research on the economic, social and employment impacts of information technology, and develop suitable instruments for collecting and disseminating statistics on emerging trends in the labour force and employment markets;
- b. foster ongoing exchange of information and dialogue between stakeholders on these issues by:
 - i. convening national fora on “Work in the Information Age” to facilitate the sharing of best practices and innovative adjustment solutions in the workplace;
 - ii. convening a series of regional conferences to identify public service options in the areas of education and skills

training, health care, social services and small business services that could meet private sector and community needs through the Information Highway; and

- c. advise governments and stakeholders in adapting existing labour policies and employment practices to the changing workplace environment and developing new approaches to foster innovative employment and labour adjustment practices.

Rec. 13.24 To maximize the job creation process on the Information Highway and minimize the negative impacts of information technology on employment and the workplace, the federal government, in partnership with provincial and territorial governments and other stakeholders, should:

- a. foster research to examine opportunities for job creation and implementation of public/private education and retraining programs;
- b. examine and negotiate within their organizations, innovative and alternative workplace practices that address work redistribution and reorganization such as phased-in retirement of older employees;
- c. ensure that workers receive adequate protection under labour standards in the face of technological change and globalization;
- d. reduce job displacement caused by technological change by encouraging firms to invest in timely and flexible human resource development programs; and
- e. encourage firms that undertake large-scale layoffs to use all available agreed to methods of mitigating job losses such as work-sharing, shortened working hours and utilization of telework options.

Rec. 13.25 The federal, provincial and territorial governments should use the Information Highway to augment their existing efforts in matching labour supply, skill sets developed through learning and training systems, and labour demand by developing a national employment and job search bulletin board.

- Rec. 13.26 The federal, provincial and territorial governments should develop a social policy framework that supports worker mobility in all its forms. This framework should include:
- a. the promotion of pension and benefits portability;
 - b. the removal of barriers to non-standard employment practices;
 - c. the facilitation of worker mobility across the country; and
 - d. the promotion of employer-paid training and employee skills development as a means of increasing the skill level of the Canadian work force in the context of the Information Highway.
- Rec. 13.27 Recognizing that employment and labour legislation comprise an area of shared jurisdiction, the federal government should initiate discussions with its provincial and territorial counterparts to:
- a. re-examine the current regulatory framework in light of the new forms of work resulting from technological change; and
 - b. ensure workers involved in new forms of work share a level of protection equivalent to protection provided to other employees.
- Rec. 13.28
- a. Governments should include workplace surveillance issues in the scope of the Council's previous recommendations on privacy (see Recs. 10.1 to 10.3). The working group, proposed to be created under Rec. 10.3, should include labour representatives.
 - b. The mandate of the working group referred to in Rec. 10.3 should be extended to include the elaboration of safeguards to protect workers against misuse of information technology in the workplace.

Consumer Awareness and Learning

What consumer awareness and learning opportunities should be provided to enable Canadians to be effective users of the Information Highway?

In the information society, success in school, the workplace and everyday life will depend on learning new and more efficient ways to rapidly access a variety of information- and knowledge-based resources. The Information Highway will stimulate the development of an enormous range of education, training and lifelong learning applications that will provide access to courses, libraries, museums, specialized databases and other people, regardless of the users' location. Users will need to understand how to access and use the Information Highway effectively if they are to derive the full benefit of these services. The Council agreed that consumer awareness and learning opportunities should be considered from the perspective of an integrated approach to learning as an ongoing process and to ensuring that Canadians had access to opportunities to learn new skills in a rapidly evolving economy.

Vision Statement for Learning and Training

Rec. 14.1 *Learning and training comprise an integral part of the knowledge economy. Canada will provide an environment for lifelong learning in which all Canadians will have access to the widest possible variety of learning opportunities and tools in order to succeed in such an economy.*

Developing a National Strategy

A comprehensive national strategy for lifelong learning on the Information Highway is required for Canada to compete in the global economy. The strategy must involve the federal, provincial and territorial governments.

Learning and training will be an integral part of the knowledge economy, and the learning and training industry will be one of the major growth sectors. This will impact on government policies, notably universality and affordability of access to learning and training.

Canada needs coordinated policies in learning and training to create wealth and improve the quality of life by ensuring a fully mobile and highly skilled work force, developing a strong Information Highway-based learning and training industry, and meeting the continuous learning and training needs of all Canadians.

Three mechanisms are proposed to launch the process: a national conference, which would bring together governments and stakeholders; a National Week for Learning in the Knowledge Economy, which would make Canadians aware of the importance of learning and training; and a national network that would ensure the process is monitored and facilitated. In this context, stakeholders include learning and training organizations and professionals (K–12 and post-secondary educators, trainers, librarians, counselors and administrators), industry, labour, non-governmental organizations, parents, technology-based learning and training suppliers and distributors, and communications and information technology firms.

- Rec. 14.2 a. Recognizing the jurisdiction of the provinces and territories in education, governments, in partnership with other stakeholders, should develop and adopt a comprehensive national strategy for lifelong learning on the Information Highway, in accordance with the following principles:
- stimulate Canadians to keep learning throughout their lives and facilitate transitions between each stage of life development;
 - ensure affordable access to learning and training on the Information Highway, including more public and private learning centres and various forms of shared facilities;
 - recognize the role of technologies in enhancing learning and training, and the role of a strong Canadian technology-based learning and training industry;
 - foster new media-based learning and training that is learner-driven;
 - assist Canadians in acquiring Information Highway skills;
 - recognize the role that each Canadian can play in introducing lifelong learning into every economic and social activity;
 - integrate learning and training into all activities of public and private sector organizations, and manage the impacts of introducing new media-based solutions;

- contribute to the creation and availability of quality content on the Information Highway, especially Canadian content, in both official languages;
 - encourage all stakeholders to resort increasingly to new media-based solutions;
 - address the needs of underserved constituencies;
 - support more R&D to foster the use and development of new media-based learning and training products and services; and
 - recognize the role of emerging delivery vehicles and providers.
- b. The federal government should propose to the provinces, territories and interested stakeholders that a national conference be organized as soon as possible to launch the process for the elaboration, adoption and implementation of the national strategy. A national network should be established, which should be a virtual, distributed environment based on voluntary participation. The primary role of the network should be to coordinate and facilitate the implementation of the national strategy.

Lifelong Learning

Lifelong learning becomes imperative in a society where individuals must cope with ever-present change. In future, most workers will have at least three to five different careers during their work life. The Information Highway becomes the vehicle that will provide Canadians of all ages and in all parts of the country opportunity to access and acquire the knowledge and skills for success.

- Rec. 14.3 Parallel to the development and adoption of a national strategy, it is also recommended that governments foster partnerships among stakeholders to develop and make accessible electronic learning-content materials and tools for all Canadians. These should be aimed at the acquisition of basic skills, the establishment of a strong supportive learning environment, the assessment of learning and training requirements (prerequisites, cost and time), the management of learning transitions, and the evaluation of the results of learning.

User Needs

The shift from production of goods to knowledge-based services creates a demand for new types of knowledge and skills, compelling organizations and individuals continually to seek ways to seize new opportunities. People in all organizations will be obliged to monitor and assess their learning and training needs on an ongoing basis in order to remain competitive and to enjoy the highest possible quality of life. Partnerships between governments and other stakeholders will be needed, at least in the short term, to develop and market the full range of learning tools required by the knowledge economy.

Rec. 14.4 Governments and stakeholders must:

- a. engage jointly in research on how learning services on the Information Highway can best help learners by adapting these to their learning style and pace, review findings periodically with further research and disseminate the results; and
- b. develop electronic tools that allow for continuous learning and training based on an ongoing assessment of user needs, which include those of individual learners, employers (for both management and employees), unions and other associations and interest groups (for their members and staff).

Learning Professionals and Institutions

Learning and training professionals have a key role in informing and assisting their students to maximize the opportunities presented by the Information Highway. Most educators and trainers have not yet had the opportunity to understand and fully use the new technologies in their work. As a result, there is a need to assist Canada's learning and training work force, so that a viable strategy and action plan can be developed to meet the needs of learners in the most effective manner possible.

A national committee for learning professionals would bring together representatives of the major stakeholders, including governments.

Students will increasingly want to access learning and training materials from distant national and international sources. This will place an obligation on learning and training institutions to make their courses accreditable from institution to institution, if they want to benefit from a larger pool of students/customers.

- Rec. 14.5 As a condition of graduation, new entrants to the learning and allied professions (e.g. teachers, trainers, librarians and school administrators) should be required to become proficient in the use of technologies for delivering learning and training services. Programs should be made available for practising learning professionals to meet this requirement within a period of five years.
- Rec. 14.6 The federal government, in partnership with all key stakeholders, should initiate a review process on the impact of technology on learning and allied professionals, their present and future roles, their organizations, learners, the learning process and learning markets. A national committee should be established to sponsor a sectoral study, recommend an action plan and monitor implementation.
- Rec. 14.7 Reform of accreditation procedures should be accelerated to facilitate mobility of students from one Canadian learning institution to another, and full transferability of credits within all levels of learning and all modes of learning delivery, in view of benefiting from increased learning opportunities provided by the Information Highway.

Course-ware and Software Market Development

The integration of technology and learning is creating new business opportunities in course-ware development, course delivery and other software applications. To meet the competitive challenge, learning and training institutions and commercial trainers need to form partnerships with technology developers.

The Canadian market for technology-based learning is small and fragmented. Each province and territory has its own educational system. Consequently, there is not yet a critical mass of users to sustain a viable learning and training industry. The development of software tools that will help identify generic needs across all provinces and territories will provide a solid basis for the production of technology-based learning products and services that can be marketed domestically and internationally.

A study commissioned by Industry Canada, titled *Suppliers of Technology-based Workplace Training: Challenges and Opportunities* (February 1992), estimated that the corporate sector in Canada would spend about \$150 million per annum in technology-based training in 1992, doubling by 1994. These

estimates do not include the educational market, which is likely to be proportionately larger. Given these trends, Canadian suppliers and learning institutions need to establish effective strategies that will position them to benefit from this rapidly expanding market. To develop these strategies, governments must facilitate the collection and dissemination of information on essential characteristics and trends of the market.

- Rec. 14.8 Governments should encourage stakeholders and, where appropriate, partnerships to develop and use electronic clearing houses and networks, distribution cooperatives and publications to:
- a. provide up-to-date information on:
 - i. available technology-based learning and training materials and suppliers;
 - ii. best practices in product development and marketing at home and abroad, which can serve as benchmarks to assist Canadian suppliers in becoming successful worldwide; and
 - iii. labour markets, such as skills requirements and certification mechanisms; and
 - b. provide learners and learning professionals with the opportunity of bulk purchasing and sharing information on learning materials and their effectiveness.
- Rec. 14.9 Provinces and territories should be encouraged, in partnership with the private sector, to develop Canada-wide full credit courses, which should be made available to all Canadians. The first course could be an introduction to the use of information technologies.
- Rec. 14.10 The Department of Foreign Affairs and International Trade should target Canadian learning technologies as a trade priority and support initiatives of technology-based learning suppliers through promotion activities such as trade missions.

Need for Information on Users and Suppliers

The *Adult Education and Training Survey* published by Employment and Immigration Canada in May 1993, and the *National Training Survey*, published in February 1993, are incomplete and cannot adequately support a

comprehensive national strategy. The data are not sufficiently comprehensive nor comparable from one survey to another. In particular, insufficient focus is given to household- and employer-based training – where the action is or should be – and to non-credit learning and training programs provided publicly or privately where too little detail is available.

Rec. 14.11 Statistics Canada and Human Resources Development Canada should enhance the Adult Education and Training Survey and the National Training Survey to include more comprehensive and comparable data on household- and employer-based training, and non-credit learning and training programs provided by public and private organizations.

Consumer Awareness

Canadians need to be more aware of and understand information technology and its potential to deliver educational, social, personal and employment benefits. The private sector can help by developing marketing techniques for information technology products and services that reach a broad range of consumers. The federal government needs to put in place an awareness strategy in conjunction with provincial and territorial governments. The goal of awareness can also be partly achieved by supporting emerging community-based networks and initiatives, including public access points.

Rec. 14.12 The federal government should develop a national public awareness strategy for consumers under the leadership of Industry Canada in conjunction with the Treasury Board and other government departments.

Rec. 14.13 As part of this strategy, the federal government should identify and support specific opportunities wherein cooperation with schools, libraries, community-based organizations and the private sector could serve to increase public awareness, understanding, literacy, competence and use of the Information Highway. This can be achieved by:

- the federal Office of Consumer Affairs identifying best practices from other jurisdictions and coordinating their implementation as appropriate;
- developing a public awareness strategy using the electronic delivery of government services and information

as a means of raising awareness;

- continuing to identify and support pilot demonstration and start-up projects that promote awareness through access points in libraries and schools, community information access centres and community networks;
- coordinating these efforts with the provincial, territorial and municipal governments in order to encourage knowledge about and participation in the Information Highway, using, for example, the existing federal infrastructure funding program; and
- supporting outreach programs targeted to special populations, including seniors, single parents and people with disabilities as well as other difficult-to-reach groups.

Rec. 14.14 The federal, provincial and territorial governments, in partnership with business and voluntary organizations, should ensure the availability of consumer information and consumer protection programs that address the need for consumer knowledge and competency in the electronic marketplace.

Rec. 14.15 The federal, provincial and territorial consumer ministries should establish networked databases of consumer information and work with provincial library systems to ensure and promote their availability to consumers.

Learning Opportunities

The Council considered a way to ensure the government was well-placed to receive and implement the Council's recommendations for learning and training. Interdepartmental cooperation is essential to achieving learning and training objectives. Bringing together those departments with a direct stake in developing learning and training policies and processes is a necessary first step.

Rec. 14.16 In the context of the Interdepartmental Committee on Implementation of the Information Highway, four departments should conclude a Memorandum of Understanding (MOU) to prepare and implement a government response with regard to the Council's recommendations on learning and training. The four departments are Human Resources Development Canada (lead), Canadian Heritage, Industry Canada and the Treasury Board Secretariat.

Government Operations

What opportunities does the Information Highway present to improve government operations?

The Council considered the experience gained from program-renewal projects under way at federal government departments and agencies – such as Revenue Canada, Health Canada, Human Resources Development Canada, Public Works and Government Services Canada – as well as from the work of its Council for Administrative Renewal.

Mission Statement

By adopting a mission statement, the government can confirm its commitment to use information and communications technology as a powerful tool to continuously improve government operations in a cost-efficient manner. The statement also provides a desired result against which to measure the overall effectiveness of individual information and communication technology initiatives.

Rec. 15.1 The government should adopt the following mission statement:

The government will make it a priority to become a world leader in the rapid introduction and generalized use of electronic information and communications systems, and in affording all Canadians the opportunity to communicate and interact electronically with its departments and agencies in either official language.

Federal Government as Role Model

The federal government must develop an integrated action plan to accelerate its effective deployment of information and communications technology products, services and networks, with the objective of improving the quality and efficiency of its operations and services. As a major creator, user and provider of information, it must instil a sense of urgency and show leadership to the business community, other governments and the Canadian public. It should pursue every opportunity to partner industry.

- Rec. 15.2 The government must be a role model in the timely deployment of the Information Highway and in the cost-effective use and promotion of information and communications technology.

Leadership and Empowerment

The re-engineering of government operations and services through information and communications technology will pose tremendous technological and financial as well as human and cultural challenges. A central leader is needed to “champion” such a far-reaching undertaking.

- Rec. 15.3 A full-time, dedicated, deputy minister-level official should be given the explicit mandate to implement Canada’s Information Highway within the federal government.

Accountability

Evaluation should be done horizontally across all departments rather than vertically, and with a view to assessing the long-term benefits of information and communications technology deployment. This evaluation should consider more than just cost efficiency; the impacts are broader.

As an objective third party, the Auditor General should continue to conduct audits of information and communications technology implementation on an ongoing basis. The benchmarks developed should be designed to allow external as well as internal audits and evaluations.

- Rec. 15.4 The new deputy minister-level official should develop evaluation and measurement criteria so that the implementation of Canada’s Information Highway within the federal government can be systematically analyzed and progress can be monitored. This implementation process should be benchmarked against the private sector and other governments.

User Acceptance

The successful introduction of new technology and systems requires that the merits, usefulness and benefits of the technology, for the individual as well as the organization, are readily understandable and that the new tools are easy to use.

- Rec. 15.5 In order to ensure broader acceptance and more effective usage of information technology by government employees, user interfaces must be easy to learn, use and operate, and learning and training

programs must be readily available. The Information Highway must be able to function in either official language. It must also be accessible to people with special needs.

Government Procurement

Individual departments should develop functional specifications for their information technology needs. System and product development generally should be left to outside suppliers because this is usually most practical, cost-effective and conducive to innovation, job creation, commercial spinoffs and export opportunities. In most cases, there should be no need for the government to own or operate its own networks.

The use of government procurement to stimulate domestic industries presents advantages. It can perform a venture capital function by sharing early risks and providing necessary cash flow to small and medium-sized enterprises, particularly those operating on the leading technology/product edge. Supplying to government can allow small producers to capture economies of scale in small domestic markets like Canada's. Government can serve as a demanding operational test bed by becoming a user of innovative products and services, including prototypes. By expressing its needs to industry in functional or performance terms, the government can create a sophisticated demand-pull for new technologies or products. Procurement activities can set quality and technological standards for suppliers and accelerating these activities accelerates the diffusion of the standard, which is particularly relevant for small and medium-sized firms. Other countries, particularly the United States, have used procurement as a tool of scientific and industrial development for many years.

Innovation can be encouraged through performance requirements and smaller contracts, and by encouraging supply consortia of small firms and fostering linkages between large firms and small firms. The government must be ready to deal with new types of consortia and "virtual organizations." The bidding process must be streamlined and more flexible in order to attract the best people and companies, particularly small and medium-sized businesses.

Rec. 15.6 In implementing its communications and information technology requirements, the government should make more strategic use of public procurement, contracting and outsourcing in order to foster innovation, job creation, commercial spinoffs and export opportunities, particularly for small and medium-sized firms, in a manner that reduces the real overall cost of operations.

APPENDIX I

Glossary

<i>ATM</i>	Asynchronous Transfer Mode: a high-speed networking technology for broadband communications. also Automated Teller Machine: an unattended terminal-type device that provides simple banking services such as cash withdrawals, transfer of funds between accounts and account balances.
<i>Bandwidth</i>	The range of frequencies required for the transmission of a signal, usually given in hertz. More bandwidth is required for carrying more complex signals; for example, in the case of full-motion video as opposed to simple voice messages.
<i>BBS</i>	(See Electronic bulletin board)
<i>Binary</i>	Where only two values or states are possible for a particular condition; for example, “On” or “Off,” or “One” or “Zero.”
<i>Bit</i>	A contraction of the term “binary digit”; a unit of information represented by a zero or one. The speed of information transmission is measured in bits per second (bps).
<i>Bottleneck</i>	Refers to local communications company network service, function or facility currently subject to some degree of monopoly control, which competitors cannot economically duplicate but to which they require access in order to compete.

<i>Broadband services</i>	A range of communications services that require and use larger bandwidth than traditional voice messaging. A broadband communication system can simultaneously accommodate television, voice, data and many other services.
<i>Broadcasting</i>	Any transmission of programs, whether or not encrypted, by radio waves or other means of telecommunication for reception by the public by means of a broadcasting-receiving apparatus but does not include any such transmission of programs that is made solely for performance or display in a public place.
<i>Bundling</i>	Practice of combining separate hardware, software and services into a package offered at a single price.
<i>CD-ROM</i>	Compact Disc with Read Only Memory; compatible with computers, compact discs are inexpensive, high-capacity storage devices for data, text and video.
<i>Certification authority</i>	A trusted authority that assigns a unique name to each user and issues a certificate containing the name and the user's public key for purposes of security of messaging.
<i>Coaxial cable</i>	Commonly called "co-ax"; high-capacity cable used in television distribution, communications and video to carry great quantities of information.
<i>Convergence</i>	The "coming together" of formerly distinct technologies, industries or activities; most common usage refers to the convergence of computing, communications and broadcasting technologies.
<i>Cross-certification</i>	Occurs when a corporation that is legally certified to provide products and services in one industry or marketplace is also certified as a legitimate or legal entity to provide products or services in another industry.

<i>Cross-ownership</i>	Refers to the practice of one corporation exercising partial or complete control of the operation of another industry through purchase or ownership of the stock in the latter corporation.
<i>Cross-subsidization</i>	Refers to the practice of applying revenues from an operation or line of business to another operation to lower the price of the latter operation; for example, local telephone rates have remained low because they were subsidized by long distance revenues.
<i>Cryptographic algorithm</i>	Also called a cipher, this the mathematical function used for encoding and decoding a message.
<i>Cyberspace</i>	The three-dimensional expanse of computer networks in which all audio and video electronic signals travel and users can, with the proper addresses and codes, explore and download information.
<i>Digital</i>	Information expressed in binary patterns of ones and zeros.
<i>Digital radio</i>	Microwave transmission of digital data via radio transmitters or radio broadcasting using a digital signal.
<i>Digital scanner</i>	A device that allows users to monitor radiocommunication frequencies automatically.
<i>Digital signature</i>	Data appended to a part of a message that enable a recipient to verify the integrity and origin of a message.
<i>Digitization</i>	The conversion of an analog or continuous signal into a series of ones and zeros, i.e., into a digital format.
<i>Distance education</i>	Education using different media such as correspondence, radio and television, but requiring little or no physical attendance at the institution offering the courses and accredited certification.
<i>DTH</i>	Direct-To-Home: TV signal broadcast by satellite received directly in a subscriber's home via a small dish antenna.

<i>EDI</i>	Electronic Data Interchange: electronic preparation, communication and processing of business transactions in a predefined, structured format using computers and telecommunications.
<i>Electronic bulletin board</i>	An electronic messaging system and an information storage area shared by several users, each having access to all messages left or posted in that area.
<i>Electronic commerce</i>	Consumer and business transactions conducted over a network, using computers and telecommunications.
<i>Encryption</i>	The coding of data for privacy protection or security considerations when transmitted over telecommunications links, so that only the person to whom it is sent can read it.
<i>Fiber optic</i>	A modern transmission technology using lasers to produce a beam of light that can be modulated to carry large amounts of information through fine glass or acrylic fibres.
<i>FreeNet</i>	Non-profit community organization that provides free access to electronic mail and information services and to computer networks such as the Internet.
<i>Full-motion video</i>	Video that is perceived to provide smooth, continuous motion.
<i>GII</i>	Global Information Infrastructure: a global information highway initiative put forward by the United States to G7 countries.
<i>HDTV</i>	High-Definition Television: television with greater resolution than the current 525-line television standard.
<i>Hertz</i>	A unit of frequency designating one cycle per second.

<i>Hypermedia</i>	Use of data, text, graphics, video and voice as elements in a hypertext system. All the forms of information are linked together, so that a user can easily move from one form to another.
<i>Hypertext</i>	Text that contains embedded links to other documents or information.
<i>Intellectual property</i>	A collective term used to refer to new ideas, inventions, designs, writings, films and others; protected by copyright, patents, trade-marks, etc.
<i>Internet</i>	A vast international network of networks that enables computers of all kinds to share services and communicate directly.
<i>ISDN</i>	Integrated Services Digital Network: a set of digital telecommunications network standards.
<i>Key escrow policy</i>	Refers to a United States policy concerning the technology that has been developed to address the concern that widespread use of encryption would make lawfully authorized electronic surveillance more difficult. Involves granting designated third parties special keys needed for law enforcement agencies to gain access, under court warrant, to encrypted communications or transactions.
<i>LAN</i>	Local Area Network: a private data network in which serial transmission is used without store and forward techniques for direct data communication among stations located within the user's premises.
<i>Local loop</i>	Designates the part of a communications circuit between the subscriber's equipment and the line termination equipment in the exchange facility.

<i>Modem</i>	A contraction of “mo(dulator)” and “dem(odulator)”: an accessory that allows computers and terminal equipment to communicate through telephone lines or cable; converts analog data into the digital language of computers.
<i>Narrowband</i>	A relatively restricted frequency band normally used for a single purpose or made available to a single user.
<i>Number portability</i>	Ability to maintain the same user number when transferring among various networks and service providers.
<i>PCS</i>	Personal Communications Services: a family of radio-communications services provided through personal user radio terminals operating in a mobile or portable mode.
<i>PKI</i>	Public Key Infrastructure: a network of connected third-party certification authorities allowing the movement of data and information between organizations that have their own security architecture or system.
<i>Protocols</i>	Sets of technology language rules that determine how various components of communications systems interact.
<i>Rate rebalancing</i>	Process aimed at increasing prices for local telephone service subsidized by long distance revenues and reducing subsidies paid by long distance service providers. (See cross-subsidization)
<i>Spectrum</i>	Range of electromagnetic frequencies capable of traversing space without the benefit of physical interconnection.
<i>Structural separation</i>	Refers to the setting up of a separate but affiliated company to provide a specific line of business. Structural separation is one approach to dealing with cross-subsidization or undue preference.
<i>Unbundled</i>	Services, programs, software and training sold separately from the hardware.

<i>Universal access</i>	The ability to get on-line to a network from anywhere or anyplace.
<i>Universal service</i>	A policy that local rates should be kept low enough to ensure that the maximum number of persons are able to afford basic telephone service.
<i>VDI</i>	Video-dial-tone: refers to the two-way or “switched” broadband carriage of information. VDI technology will provide the platform for video-on-demand services. A switched communications system is one that allows two-way, point-to-point exchange of information.
<i>Video compression</i>	The process of compacting data, so that more can be stored and transmitted.
<i>Video-on-demand</i>	A service that allows the user to dial a video-dial-tone system, choose a video and play it.
<i>Virtual reality</i>	An interactive, simultaneous electronic representation of a real or imaginary world where, through sight, sound and even touch, the user is given the impression of becoming part of what is represented.
<i>WAN</i>	Wide Area Network: a communications network made up of a number of Local Area Networks (LANs) and/or Metropolitan Area Networks (MANs), allowing access to data physically located at widely disparate distances.

APPENDIX II

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* These members did not serve to the end of the Council's mandate.

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* These members did not serve to the end of the Council's mandate.

APPENDIX III

Council Publications

The Canadian Information Highway: Building Canada's Information and Communications Infrastructure. (April 1994) Spectrum, Information Technologies and Telecommunications Sector, Industry Canada.

Canada's Information Highway: Services, Access and Affordability. (May 1994) Prepared for Industry Canada by Elisabeth Angus (Angus Telemanagement Group) and Duncan McKie (Decima Research).

Privacy and the Canadian Information Highway: Building Canada's Information and Communications Infrastructure. (October 1994) Communications Development and Planning Branch, Spectrum, Information Technologies and Telecommunications Sector, Industry Canada.

Canada's Information Highway: Building Canada's Information and Communications Infrastructure. Providing New Dimensions for Learning, Creativity and Entrepreneurship. (November 1994) A Progress Report of the Information Highway Advisory Council.

Copyright and the Information Highway. (December 1994) A Preliminary Report by the Copyright Subcommittee, Canadian Content and Culture Working Group, Information Highway Advisory Council.

Access, Affordability and Universal Service on the Canadian Information Highway: Building Canada's Information and Communications Infrastructure. (January 1995) Information Highway Advisory Council.

Copyright and the Information Highway. (March 1995) A final report by the Copyright Subcommittee, Canadian Content and Culture Working Group, Information Highway Advisory Council.

Affordable and Equitable Access to the Information Highway. (May 1995) Prepared for the Information Highway Advisory Council by John Gilbert, Ken Hepburn and Guido Henter.

The Economic Impacts of the Information Highway: An Overview.

(July 1995) A Discussion Paper by the Task Force on Growth, Employment and Competitiveness, Information Highway Advisory Council.

APPENDIX IV

Minority Report by Jean-Claude Parrot

After participating as a member of the Information Highway Advisory Council for 15 months, I decided that it was necessary for me to issue this minority report. This decision was not taken lightly. Nor was it taken until the final Council meeting on July 28, 1995.

From the moment of my appointment to the Council, I was primarily concerned about one overriding issue: the impact of information technology on employment and the workplace and the Council's response to that impact. From my trade union perspective, this was to be the measure of our "success." In the end, I had to conclude, regrettably, that the treatment of this issue was inadequate for Canadian workers – present and future.

I want to make it clear from the outset that my dissent from the Council's final report does not encompass the report in its entirety. There are several positive aspects of the report, for example, in the areas of Learning and Training and Canadian Content and Culture, which are the result of the time and effort contributed by the members of the Council, its working groups and the public employees involved in the process.

Rather, I parted company with the Council over one of its central themes and, more particularly, the influence of that theme on the consideration of employment and workplace issues. This theme, evident throughout our deliberations, is stated in the executive summary of the Council's final report:

In the new information economy, success will be determined by the marketplace, not by the government. Hence, the primary role of the government should be to set the ground rules and to act as model user to inspire Canadians. The private sector should build and operate the Information Highway. Those who make the investments should bear the risks and reap a fair reward.

In this respect, Council's advice is likely to resonate well with the federal government, reinforcing as it does the modern trend described by noted British historian Eric Hobsbawn:

The central fact about the post-1975 crisis decades is not that capitalism no longer works as well as it did in the golden age, but that its operations have become uncontrollable. Nobody knows what to do about the vagaries of the world economy or possesses instruments to manage them. The nation state has lost its economic powers.... As the transnational economy tightens its grip on the world, it undermines the territorial nation state. Such a state can no longer control more than a diminishing part of its affairs. Organizations whose field of action is effectively bounded by the frontiers of their territory – i.e. parliaments and trade unions – therefore, lost, while organizations not so constricted, like transnational companies, the international currency market and the globalized media and communications of the satellite era, gained.

For some, the world portrayed by Hobsbawn is to be welcomed and encouraged; for others, it represents a direction to be reversed. I count myself among the latter. For more than a decade in Canada, we have witnessed the implementation of policies specifically designed to diminish the government's role in society in favour of markets and competitiveness. Free trade, deregulation, privatization and cuts to social programs and public services have been at the core of this agenda. We have also witnessed the effects of this agenda here and around the world – increasing gaps between rich and poor, more poverty, more insecurity and, at the root, an unrelenting employment crisis.

I became concerned that the same ideological approach that had already produced so many negative consequences for workers was dominating the Council process. Thus, I asked Canadian Labour Congress (CLC) President Robert White to write the Honourable Lloyd Axworthy, Minister of Human Resources Development, requesting the establishment of a parallel committee to examine more thoroughly the social implications of the Information Highway outside the constraints of the competitiveness agenda and to involve a broader cross section of Canadian society. This request was denied but I am convinced more than ever of its necessity.

The Council's progress report in November 1994, *Canada's Information Highway: Building Canada's Information and Communications Infrastructure*, confirmed and heightened my concern with the following statement:

...Council members agree that competition, not regulation, should drive the development of the Information Highway and new communications and information services.... Whereas traditionally the key providers of the network infrastructure, namely the telecommunications and cable television industries, have been regulated, technological change and the global forces of deregulation and free trade have resulted in pressures for greater reliance on market forces and deregulation.

Consequently, I felt compelled to register more formally my disagreement with the thrust of some of the Council's recommendations. For example, I found recommendations 12.1, 12.4 and 15.6 to be unacceptable.

Nevertheless, the final report reflects quite extensively and accurately the Council's general view about the appropriate roles for markets and governments vis-à-vis the Information Highway. This view is especially pronounced in Chapter 2, *Competitiveness and Job Creation: The New Marketplace*, as well as in the recommendations under the issues of timing and financing; competition and regulation and growth; and employment and competitiveness.

It was against this backdrop – a well-entrenched view about the subordination of governments to markets – that discussion on employment and workplace issues finally took place late in the Council's mandate. The results of that discussion are well captured in Chapter 4, *Access and Social Impacts: The Human Dimension* and recommendations 13.23 to 13.28 in the Council's report. The final report succinctly summarizes the areas of divergence that ultimately became impossible to bridge.

My approach to the interaction between the Information Highway and employment/workplace issues was influenced by a number of contextual factors.

First, some 35 million people are out of work in OECD countries (which account for 75 percent of world economic activity) and many millions more are out of work in developing countries; global unemployment rates remain at their highest levels since the 1930s.

Second, the accelerating pace of technology is among the reasons for this persistently high unemployment. As well, information technology has diffused itself throughout the economy and demonstrated its inherent capacity to transfer work across national borders.

Third, non-standard forms of employment – telework, homework, contract work and part-time work – are flourishing more, relative to traditional full-time employment, as the contingent or peripheral labour force expands, thus placing a premium on more flexibility rather than stability.

Fourth, the job displacement effect of technological change is being felt, not only within the information infrastructure (for example, the significant downsizings announced by Bell and Unitel in early 1995) but also within the resource, manufacturing and service sectors that are integrating information technologies into their operations.

Fifth, whether one is inclined to emphasize the job-creating or job-destroying impact of new technology, there can be little dispute over the reality of, at the very least, short-term dislocation. Furthermore, American author Jeremy Rifkin, presents a plausible argument that the current wave of technological change is fundamentally different from its predecessors in speed, nature and scope.

Among Rifkin's observations:

- The impact of previous technological advances, such as the advent of electricity, was confined to a small part of the economy, mainly manufacturing; in contrast, information technology has the potential to impact across all economic sectors.
- In the past, when new technologies replaced workers, a new sector was always available to absorb the loss; in contrast, today's principal growth area, the service sector, will itself be directly impacted by these structural changes.
- Information technology is being introduced at a much faster rate than were earlier technologies, giving societies considerably less time to replace jobs lost and retrain workers for the new jobs that will eventually be created.
- Due to its transparency to time and distance, information technology makes work more portable, allowing jobs to be moved to new jurisdictions where the cost of labour is lower. In essence, the technology not only reduces demand for labour, it also increases its supply.

Last, organized labour's economic and social objectives have always depended primarily upon two levers – collective bargaining and political action through legislative reforms affecting such matters as pensions, health care, workers' compensation and unemployment insurance. Anything that erodes the contribution of one or both of these levers is a detriment to not only unionized workers but also unorganized workers.

Discussion of employment and workplace issues within the Council focused on a report titled *Impacts of the Information Highway on Employment and the Workplace* (Goss Gilroy Inc., May 19, 1995). Based on research and input from an expert panel, this report made 69 recommendations to respond to the following concerns:

- The introduction of information technology creates a mismatch between the supply and demand of skilled labour, which is a causative factor in the structural unemployment observed today.
- It is not possible to solve structural unemployment by focusing only on the mismatch between labour supply and demand, as this represents only a small proportion of the work force at the cutting edge of technology.
- Irrespective of its overall employment impact, information technology will have a profound impact on the composition of jobs and the pattern of wages.
- The introduction of these technologies creates a bipolar distinction of work and income with an elite class of highly paid, highly skilled knowledge workers and a large pool of lower-paid, variable-skilled workers with narrowly defined skill sets.
- It is the polarization and atomization of work and the displacement of workers at all skill levels that are of most immediate concern regarding the impact of information technology.
- The employment impact of information technology will vary according to industry and sector and will be highly dependent upon the degree of innovation.
- The enabling aspects of information technology will depend upon both the rate and extent of diffusion and absorption of the technology.
- The inadequacy of current programs in education, training and skills development in reflecting the knowledge requirements and learning tools

for an information economy is an impediment to the rapid diffusion of information technology.

Following the submission of the Goss Gilroy report to the Council, I participated fully in a two-month effort of a “bridging committee” to examine the report’s 69 recommendations, prioritize them in terms of relevance, consolidate them where possible and seek compromises that could be acceptable around the table. At the end of this period, only six recommendations (Recs. 13.23 to 13.28) constituted the basis for the broadest possible consensus and were finally adopted by the Council.

Obviously, I believe this package of six recommendations falls short of what Canadian workers need and deserve. In contrast, I supported a set of 10 recommendations that flowed from the Goss Gilroy report itself, not from outside the Council process. I believe these recommendations, while relatively modest in scope, would have conveyed a significantly stronger and more directive message to the government than those approved by the Council. The 10 recommendations, when compared with the Council’s recommendations on employment and workplace issues, reveal the differences in approach, scope and emphasis that led to this minority report.

I think it is important to highlight the principal reasons for my dissent.

First, market-driven solutions to unemployment clearly do not work. They ignore the responsibility, which ought to be shared between the private sector and the government, to create jobs. The CLC, recognizing the need for an “agenda for jobs,” has developed a nine-point job-creation strategy to stimulate growth and jobs composed of the following:

- clear job-creation targets
- job creation as a key priority in setting Bank of Canada policies
- public investments in infrastructure
- public service jobs in our social infrastructure
- “Buy Canadian” government procurement policies
- a national strategy to rebuild our industrial base
- a national investment fund
- shorter work time
- international cooperation to support sustainable growth.

Second, there is a significant difference between “protecting against the erosion of labour standards” and “ensuring adequate protection” in the face of technological change and globalization. The latter could well translate into eroded standards as “adequate protection” is redefined downward by the pressures of technological change and globalization.

Third, “working at the international level to develop social charters among trading partners” not only is consistent with minimizing negative impacts but also encompasses such issues as the exploitation of children, forced labour, the denial of freedom of association and free collective bargaining and discriminatory employment practices – all areas where appropriate standards are needed to ensure level playing fields.

Fourth, based on the widely acknowledged inadequacy of voluntary, employer-based training, there is an ever more obvious need for stronger adjustment and transition mechanisms, a levy/grant system for training, and legislated, mandatory training where technological change causes workplace reorganization.

Fifth, the key to ensuring the necessary follow-up is a clear and detailed direction on the type of legislative changes and their enforcement that should be addressed by the federal government within its jurisdiction. This direction applies also to the area of electronic surveillance in the workplace.

Finally, the introduction of mandatory employment-impact statements to accompany corporate plans would be a timely and necessary reform of the public policy/decision-making process aimed at ensuring that broader, rather than narrow commercial, interests are taken into account.

Naturally, I am frustrated and disappointed that my efforts within the Council on behalf of workers could not have been more persuasive. However, contrasting with this frustration and disappointment was the June 1995 Annual Conference of the International Labour Organization (ILO), which adopted a series of wide-ranging recommendations from a tripartite (government, business, labour) committee on the issue of home work, which included the following:

- adoption of standards on home work
- standards to be implemented in the form of a convention supplemented by a recommendation
- definition of a home worker
- the government to develop national policy aimed at improving the

situation of home workers and the equality of their treatment with other workers, accompanied by a list to which the policy should apply in particular

- home workers to be included in national basic labour statistics
- implementation of national policy bylaws and regulations and other appropriate matters
- laws and regulations prohibiting certain types of work and the use of certain substances in home work
- a system of inspection and adequate remedies, including penalties for violation of laws and regulations
- this convention not to affect more favourable provisions under other international labour conventions
- keeping detailed data for publication
- employers to inform home workers in writing of their specific conditions of employment and changes when they occur
- employers to notify competent authority when they give out work for the first time, directly or through an intermediary, to home workers
- employers to keep a registry of home workers by sex
- employers to keep record of work allocated to home workers indicating time allocated, rate of remuneration, costs incurred, deductions, gross remunerations due, and net paid with date of payment and a copy of record to the home worker
- inspectors to be allowed to enter parts of the home where the work is carried out
- in case of violations, appropriate measures, including prohibition of giving out home work
- minimum wage
- rights to organize and to bargain collectively
- remuneration
- occupational safety and health
- hours of work, rest periods and leave
- social security and maternity protection
- protection in case of termination of employment
- resolutions
- programs to assist home workers.

Home work is a phenomenon that is being facilitated by information technologies. It raises important issues such as social isolation, balancing work and family life, monitoring of work, protecting work jurisdictions, to name but a few. The manner in which this tripartite international forum addressed these

questions is illustrative of the fact that even in a sea of deregulation, a lifeboat of legislation and regulation can still be recognized as necessary to protect workers.

It is my belief that the balance of interests represented on the ILO committee created an environment that was more conducive, compared with the Council process, to producing balanced conclusions and recommendations on home work. A similar representative equilibrium could presumably result in balanced conclusions and recommendations with respect to other issues, such as legislative changes, in the field of employment and the workplace.

Furthermore, I believe the set of 10 recommendations that I support comes far closer to achieving this balance than do the approved recommendations, precisely because it is not constrained by the Council's prevailing theme on the role of government.

In conclusion, I can only hope that this minority report, issued by the sole labour representative on the Council will, within its specific scope, have some influence on the government that sought our input and advice. My recommendations on employment and workplace issues follow.

Social Impacts and Workplace Issues

1. The government should form, in partnership with provincial and territorial governments, industry, labour and other stakeholders, an information technology advisory body, which should:
 - a. seek from the full spectrum of public interests, input and recommendations on information technology related social policy issues;
 - b. convene a series of regional conferences to identify public service options in the areas of education and skills training, health care, social services and small business services that could meet private sector and community needs through the Information Highway; and
 - c. establish an ongoing national forum to address the impact of technological change on employment and the workplace.

Job Creation

2. Consistent with the Council's primary objective of maximizing the opportunities for job creation through the Information Highway:
 - a. the government should, in the context of a commitment to the goal of full employment, formally link employment policies and Information Highway initiatives; and
 - b. governments and industry should:
 - i. recognize their responsibility to create employment and train workers for employment in emerging technologies;
 - ii. conduct ongoing research to examine opportunities for job creation and implementation of public/private education and retraining programs;
 - iii. develop pilot job-creation initiatives funded by industry and government and focused on long-term job creation through information technology; and
 - iv. use their procurement power in the marketplace to leverage job training and job creation.
3. To minimize the negative impacts of the Information Highway on employment and the workplace, the federal government, in partnership with provincial and territorial governments and other stakeholders, should:
 - a. protect against the erosion of labour standards caused by technological change and globalization;
 - b. reduce job displacement inherent in technological change by encouraging firms to invest in timely and flexible human resource development programs;
 - c. require firms that undertake large-scale layoffs to use all available and agreed-to methods of mitigating job losses such as work-sharing, shortened working hours, and utilization of telework options;
 - d. examine and negotiate within their organizations innovative and alternative workplace practices that address work time redistribution and reorganization such as phased-in retirement of older employees; and

- e. work at the international level to develop social charters among trading partners to promote social policies abroad and ensure a level playing field.

Training and Deployment

- 4. The federal, provincial and territorial governments should use the Information Highway to augment their existing efforts in matching labour supply and demand, through the development of a National Employment and Job Search Bulletin Board.
- 5. The federal, provincial and territorial governments should develop a social policy framework that supports workers in their movement among employers and between the home, the workplace and the education/training system. This framework should include:
 - a. the promotion of pension and benefits portability;
 - b. the removal of barriers to non-standard employment practices, provided such practices are acceptable to employers, workers and workers' representatives;
 - c. the facilitation of worker mobility across the country;
 - d. the strengthening of adjustment and transition mechanisms for workers;
 - e. the implementation of a revenue-neutral levy/grant system as a means to increase the amount of employer-based training and retraining; and
 - f. legislated, mandatory, employer-paid training and skills upgrading for workers affected by the introduction of new technologies and processes that cause changes to workplace organization or definition.

Legislative Changes

- 6. The federal government should review and, where appropriate, amend the *Canada Labour Code* and other relevant federal labour legislation and regulations to ensure that workers in non-traditional Information Highway-related employment – such as telework, electronic home work, telecommuting and mobile work – are fully recognized by law and entitled to the full scope of benefits and protection afforded to other workers under such legislation. Areas of review include:
 - a. updated legal definitions:

- i. the urgent need for a legal definition of the term “employee” to extend coverage of labour legislation and the equivalent standards and level of protection to teleworkers as for traditional employees;
 - ii. the importance of making clear that the place of work is not relevant in determining whether a worker on the Information Highway is excluded from labour legislation;
- b. fair working standards and protection against discriminatory or inequitable practices for teleworkers:
 - i. the importance of signing a written contract of employment with teleworkers, or their bargaining agent when represented by a union, with a written summary of the conditions of employment, including piece or hourly rates, the nature and amount of work and completion deadlines;
 - ii. the importance of ensuring that telework is not being used by employers to unilaterally change jobs to part-time, subcontract or self-employment status;
- c. hours of work and overtime:
 - i. coverage of teleworkers by hours of work provisions similar to those contained in existing legislation and collective agreements;
 - ii. limits of overtime and allowances for employees to refuse overtime beyond their established hours of work;
- d. health and safety, provision of equivalent standards and protection to teleworkers in relevant health and safety legislation and regulations; and
- e. equivalent benefits to teleworkers on the Information Highway, including prorated benefits for part-time workers.

Enforcement

7. There is a strong need for mechanisms to monitor and enforce amended legislative provisions to apply to workers on the Information Highway. As one means to achieve this goal, the government should, in cooperation with provincial and territorial governments and other stakeholders, create a registry or some other mechanism to better monitor working conditions of employees who work at home. Such mechanisms should include:

- a. a requirement for employers to provide accurate information on hours of work and pay for their home-based employees;
- b. a mechanism to enable home-based employees to verify the accuracy of information supplied by their employers and to be able to communicate among themselves and access electronic bulletin boards for general notices and information from their employer as well as their union, where it exists; and
- c. any such mechanism to be subject to federal and, where applicable, provincial privacy legislation and practices.

Harmonizing Federal and Provincial Legislations

- 8. Recognizing that labour legislation is an area of shared jurisdiction, the federal government should initiate discussions with its provincial and territorial counterparts concerning the harmonization and strengthening of relevant statutes to ensure coherent, fair and safe working conditions for teleworkers across the country.

Electronic Surveillance

- 9. The government should implement, following consultations with employers and employees' representatives, safeguards to improve protection for workers against electronic surveillance, including:
 - a. the requirement for management to inform employees of all overt and covert surveillance activity or capability;
 - b. identification of the technologies used and purpose of the activities;
 - c. assurance that surveillance activities do not violate privacy protection practices; and
 - d. a mechanism for recourse in the event of surveillance disputes.

Mandatory Employment Impact Statements

- 10. The government should require the mandatory provision of employment and workplace impact statements from firms that apply for federal regulatory approval, tax incentives or other financial assistance for the development of Information Highway initiatives.

